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The 1980 Census: The Counting of America

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The 1980 Census: The Counting of America

By Peter K. Francese

Abstract—Centered on April 1, 1980, the 20th decennial census of the United States comes at a time of rapid demographic, social, and technological change, coupled with growing public and private demands for accurate population data while at the same time public suspicion of federal government activities has increased. This *Bulletin* describes the Census Bureau program for meeting these challenges and conducting and making available the results of an operation that will attempt to reach some 80 million households with a mailed questionnaire and cost nearly $1 billion. It examines in detail the questionnaire itself and the planning that went into it; the Census Bureau plans and programs for eliciting public cooperation and finding everybody in an effort to increase coverage even beyond the estimated 97.5 percent coverage of the 1970 Census; how the 1980 Census results will be processed and published, how they can be obtained, and their importance for public programs ranging from Congressional reapportionment and federal revenue sharing to local services planning, and for private businesses of all kinds; and the census geography and revolutionary computerized address coding systems devised by the Census Bureau which make it possible to handle a census of this size largely by mail. The conclusion briefly discusses plans for the first U.S. mid-decade census in 1985 and summarizes the issues that will make the 1980 Census "the most dramatic, important, and closely observed in U.S. history."

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Graphics: James O'Brien

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The 1980 Census: The Counting of America

By **Peter K. Francese**

American Demographics
Ithaca, N.Y.

Mr. Francese is publisher of American Demographics *magazine and president of American Demographics, Inc., P.O. Box 68, Ithaca, New York 14850. Published ten times a year,* American Demographics *magazine is written to serve the people who produce, analyze and use demographic information in business and government.*

Mr. Francese serves on the Census Bureau's Population Advisory Committee and has served as chairman of its Committee on Small Area Statistics. He is a member of the Population Association of America, the American Statistical Association, and the American Planning Association.

Mr. Francese has worked as a consultant in the demographic data field, and has worked for several public and private organizations. He holds a Master of Regional Planning degree from Cornell University, a Bachelor of Civil Engineering from Rensselaer Polytechnic Institute, and a Bachelor of Science in Physics from Washington and Lee University.

Mr. Francese wishes to acknowledge the editorial assistance of Bryant Robey, Editor, and Penelope Crissman, Copy Editor, of American Demographics *magazine, and the helpful comments received from Conrad Taeuber in the preparation of this* Bulletin. *Further, the* Bulletin *would not have been possible without the cooperation and assistance of a large number of people at the Bureau of the Census. However, the responsibility for all opinions expressed herein and any errors or omissions rests with the author.*

The most popular television program ever, "Roots," had an audience of only about half of all U.S. households. But the Census Bureau will attempt on April 1 of 1980 to reach every single one of the estimated 80 million American households and get them to fill out a questionnaire for our country's 20th decennial census. That is the goal, at least.

In reality the goal is never quite reached, just as no other activity can ever reach 100 percent of a people as diverse, mobile, and independent as Americans. In the 1970 Census, 97.5 percent of the population was counted, as nearly as Census Bureau researchers could estimate, with proportionately more blacks than whites being missed. For 1980, the Census Bureau will hire more than a quarter of a million enumerators and spend almost $1 billion to see that the coverage of what are expected to be about 222 million people is even closer to the elusive 100 percent.

The reason the government is trying so hard to count everyone lies in the high value census information has for our complex and changing society. Population and housing statistics from the decennial census and the estimates based on them in the intervening years have become an integral part of planning for virtually every government program and every consumer product or service.

The 1980 census will provide a statistical snapshot at a time of unprecedented demographic change. The U.S. birth rate is now the lowest it has ever been; life expectancy is rising. The South and West have become the nation's growth areas, and there is migration out of the older population centers of the Northeast and North Central states. Total U.S. population is growing by less than 1 percent a year; but households are growing at over 2 percent a year. The 1980 Census will measure these trends with a precision that cannot be achieved otherwise, will provide data to clarify the trends, and thus give us all a basis for adjusting plans and programs accordingly.

The background

The clarity of the snapshot, of course, depends ultimately on the cooperation of the people who fill out the questionnaire. It also depends on the skills and experience of the Bureau of the Census. The Census Bureau has had considerable practice in counting people. There have been decennial censuses since 1790 but in the early decades they were rather ad hoc affairs when compared with today's efforts. Censuses were conducted by U.S. Marshals until special census agents were hired for the first time in 1880. Since we were an essentially rural and lightly populated country during our first 100 years, the census was far from the massive operation it has become.

But with the turn of the century came the realization that accurate national statistics were essential to the functioning of a growing industrial nation. The Census Bureau was permanently established in 1902, was made part of the Department of Commerce and Labor in 1903, and was assigned to the newly created Department of Commerce in 1913. In addition to taking the decennial Census of Population and Housing, the Bureau conducts the Economic Censuses, a Census of Agriculture, and a Census of Governments every five years, as well as hundreds of surveys, some as often as once a month.

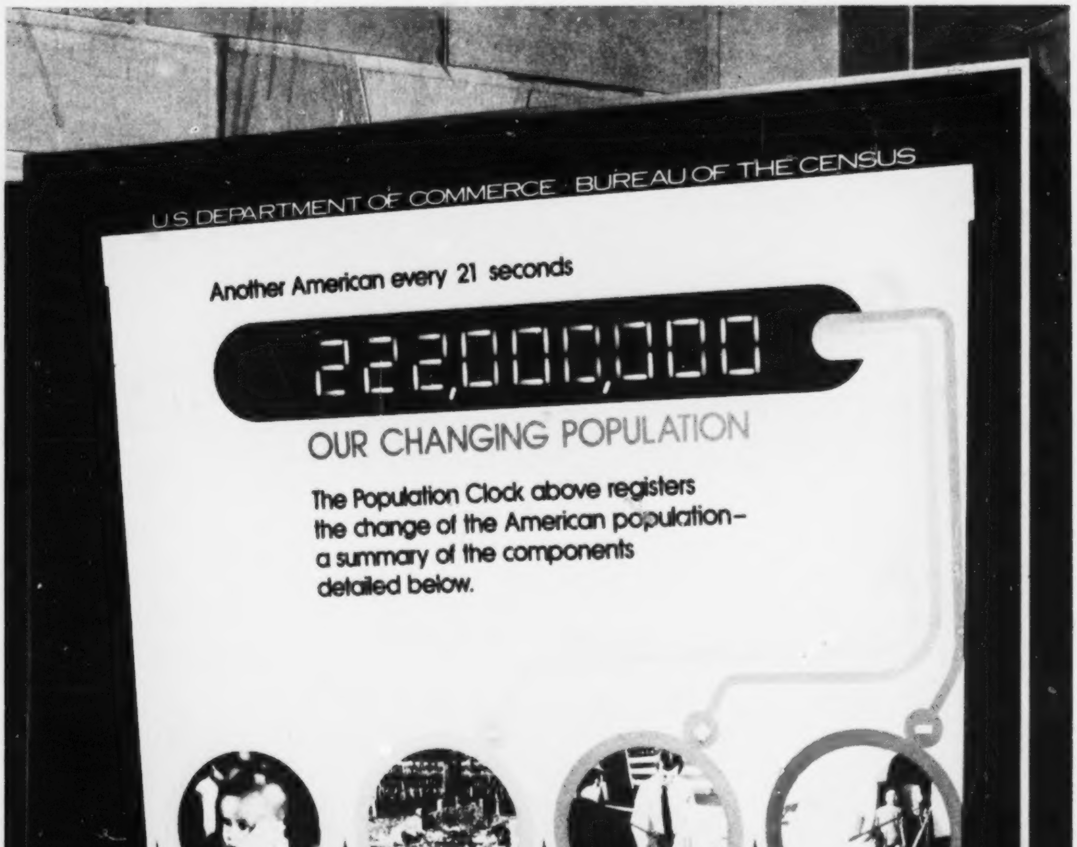
Taking the census balances the government's need to have statistical information against the citizen's right to privacy. The same law (Title 13, U.S. Code) that requires public cooperation with the census also protects the confidentiality of individual information. Respecting privacy is thus translated into the Census Bureau's pledge of confidentiality, a cornerstone of citizen cooperation. Information on individual census questionnaires is used for statistical purposes only and any data that can be linked to any individual are not given or sold to anyone.

Persuading the public of this fact in 1980 may prove more difficult than in the past, given the distrust of the federal government that has arisen in recent years and the rapid developments in computer data storage and processing. Although civil libertarians warn of the potential dangers of collecting and storing census information on individuals, they agree that never has the Census Bureau allowed such data to find their way into the records of other agencies or even to be seen by them. Nevertheless, public perception does not necessarily make distinctions among branches of the federal government.

Why a census?

That census statistics are vital not only to federal agencies and large corporations but also to the general public is beyond question. They determine the apportionment of seats in the House of Representatives and are the basis for drawing political boundaries for state legislatures as well as local election districts. In addition, they are used to allocate more than $50 billion each year from the federal government to state and local governments. These allocations affect the level of services to people and, therefore, the local and state taxes they must pay.

Beyond reapportionment, the program most directly tied to Census Bureau statistics is revenue sharing. Since its inception in 1974, the revenue-sharing program alone has dispensed nearly $40 billion to approximately 39,000 local governments. The allocation is based on a complicated formula which weighs



U.S. DEPARTMENT OF COMMERCE · BUREAU OF THE CENSUS

Another American every 21 seconds

222,000,000

OUR CHANGING POPULATION

The Population Clock above registers the change of the American population–a summary of the components detailed below.

A BIRTH every 10 seconds

A DEATH every 16 seconds

AN IMMIGRANT every 81 seconds

AN EMIGRANT every 15 minutes

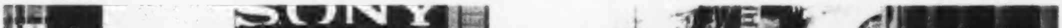
On Census Day, April 1, 1980, the reading for the total U.S. population on this clock at the Department of Commerce Washington D.C. headquarters is expected to be about 222 million.

several factors. Two of the more important are population and per capita income—both provided by the Census Bureau. Some people may think the Bureau is snooping when it asks how much money they made last year, but the information, in statistical form, is an essential ingredient in the formula for what is certainly the largest federal program to assist local governments.

The Census Bureau faces its greatest problems getting cooperation in inner cities, where suspicion of government data collectors is greatest. Many of our nation's cities have been in difficult financial circumstances for some time. A complete census will do more to assure them of their fair share of federal funding than any single event for the next decade, barring a dramatic shift in urban policies. On the other hand, failure to support the census will almost certainly result in further handicapping municipalities in their struggle to combat urban decay. It is a dilemma.

Showing people that they should take the time to inform themselves of the importance of the census is probably the Bureau's biggest task. To begin with, it is the Census Bureau's job to prepare an easily understandable questionnaire, make it available in sufficient quantity, and to provide assistance to people who need help in filling it out. After the census, it is the Bureau's responsibility to tabulate the statistical data. The U.S. Postal Service has been assigned the task of delivering the questionnaires and picking them up, like any other piece of mail, for all but 10 percent of the country, where census enumerators will collect the completed forms. The news media will be provided with a full-scale publicity campaign with which to inform everyone that the census is taking place and that it is important for everyone to fill out the form.

But, the respondent has the most fundamental responsibility of all—to fill out the questionnaire and put it into the mailbox. In the end, the responsibility for a successful census rests with every American. Census Director Vincent P. Barabba has said, "Everyone has a right to be counted, but you can't force people to be counted."



Complete census coverage in the nation's cities will help assure them of their fair share of federal funding.

Planning for the Census

Although the census comes to public attention for only a few months every decade, it is virtually an around-the-clock operation for several years. Its magnitude can scarcely be grasped, nor the incredible detail required to achieve accuracy. We like to think that computers can solve our biggest problems in only a few seconds. The Census Bureau's computer will work for 2,000 hours just to prepare the addresses used to mail the questionnaires. And, if you were to put all the questionnaires end to end, they would stretch more than 38,000 miles—around the equator one and a half times, and a little further.

It will cost between four and five dollars per person to take the 1980 Census, a substantial increase over the previous census. About one-fourth of that some $1 billion will be spent on improving the coverage—trying to find every household and person in the U.S. and count them.

Planning the questionnaire

The first effort in planning for the census is, of course, to provide a simple, easy-to-complete questionnaire that is as short as possible but provides reliable and needed information. To this end, the Census Bureau began as early as 1974 to gather suggestions on what should be asked and what information was no longer needed. After more than 70 public meetings across the country, some questions were dropped and several more were added. For example, there is no longer a need to ask people whether they have a television set in the home; virtually every household has one. Questions on appliance ownership were also dropped. But several questions were added to try to measure total shelter costs, reflecting a need for better data in the face of rising housing costs.

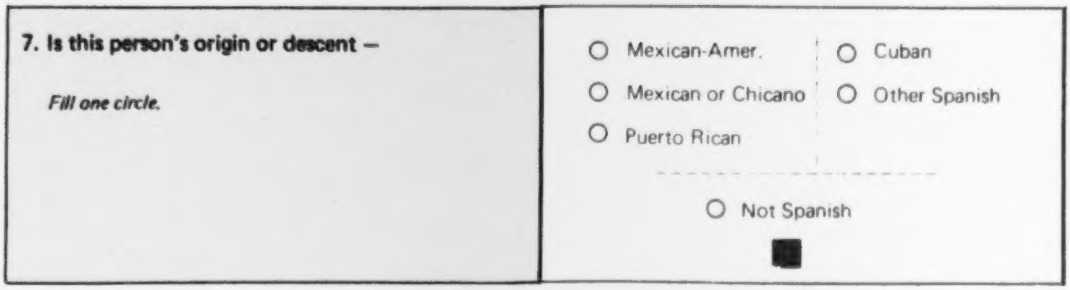
Beginning in 1975, the Census Bureau conducted several national tests of the content of the questionnaires. Different questionnaires were mailed to selected groups of 14,000 households to test response rates and validity of the data. In addition, the Bureau ran several tests of enumeration methods to find the best ways of distributing and collecting questionnaires and improving coverage. Along with about ten of these content and methods tests, four small-scale censuses were conducted in Travis County (Austin), Texas, Camden, New Jersey, Oakland, California, and Puerto Rico to test various aspects of census-taking procedures. Finally, three "dress rehearsal" censuses, conducted in two rural Colorado counties, in Richmond, Virginia, and in the Lower Manhattan section of New York City, tested and evaluated virtually every detail of the census plans. Throughout the process, items of the questionnaire and census procedures were reviewed with an eye toward disposing of those that did not test well.

As a result of the tests, the wording of some questions was changed to make them more easily understandable, while several questions were dropped because it was found that they did not produce reliable data. An important question that changed as a result of testing is one on Spanish origin that had recently been added to the census 100 percent questionnaire.

In the Richmond dress rehearsal, this question produced unacceptably high non-response rates. It was then revised for the later dress rehearsal in Lower Manhattan and, in addition, a national test was done by mail in which half of a sample of 6,500 households was given the Richmond version and half was given the Manhattan version. The result was that the question format used in Lower Manhattan substantially reduced the non-response rates, and that version was finally used. The Richmond test and

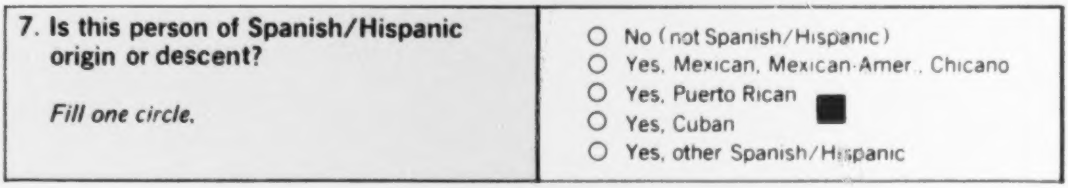
Figure 1. Spanish Origin Question

Richmond Test Version



7. Is this person's origin or descent – *Fill one circle.*	○ Mexican-Amer. ○ Mexican or Chicano ○ Puerto Rican ○ Cuban ○ Other Spanish ○ Not Spanish

Final 1980 Questionnaire Version



7. Is this person of Spanish/Hispanic origin or descent? *Fill one circle.*	○ No (not Spanish/Hispanic) ○ Yes, Mexican, Mexican-Amer., Chicano ○ Yes, Puerto Rican ○ Yes, Cuban ○ Yes, other Spanish/Hispanic

the final version of the question are shown in Figure 1. There is no doubt that the statistical information obtained from this question will be better because of the extensive testing and evaluation procedures.

Also tried out in the tests was a new set of housing questions designed to provide some indicators of housing quality or structural condition. Analysis of the results showed that questions such as "Does this house have open cracks or holes in the interior walls or ceiling?" did not add very much information about housing quality and they also aroused some unfavorable reaction. Consequently, the new housing condition questions were omitted from the final questionnaire.

Also proposed was a group of questions to measure shelter costs for homeowners, such as mortgage payments. These questions tested well and produced reliable results, with the exception of one that asked if there was a property improvement loan. So few households were able to answer that question that it was omitted from the final version which, however, includes seven questions on shelter costs, as seen on page 5 of the reprinted questionnaire *(Bulletin* page 21).

All testing was finished and evaluated by the end of 1978. The year 1979 is reserved largely for printing the millions of questionnaire forms and compiling the address lists used to mail the questionnaires distributed by that method.

Finding everybody

In preparation for the census, the Bureau creates a complete list of all places where people live or might live, an obviously important element in a census by mail. The heart of such an operation is the address list, prepared by a commercial vendor, then checked and corrected three times by the U.S. Postal Service—and further checked and corrected by the Census Bureau. In the 1980 Census, procedures similar to those in 1970 will be used to create the address list. Several firms which offer lists for sale bid to supply the Bureau with initial address lists, and the completeness of each one is a major factor in determining which lists are purchased. For areas where commercial lists are not available, the Census Bureau creates its own with its own field staff.

The Census Bureau estimates that its preliminary address list or "inventory" will amount to about 86 million "dwelling units" (including apartments and rented rooms) but that checking will reveal that about 6 million of these units are unoccupied. Therefore, it is expected that the questionnaires mailed on March 28, 1980, will go out to about 80 million households.

As a final check on the address list, census enumerators, just prior to the mailing of questionnaires, will systematically recheck their assigned areas, identifying any occupied dwelling units that have been missed and adding them to the list.

U.S. CENSUS
FIELD DIVISION

Census enumerators follow up on questionnaires not mailed back within two or three weeks of Census Day or those arriving with incomplete information.

Enumerators are also responsible for seeing that completed questionnaires are returned for every address in their areas. Where questionnaires arrive with missing information, enumerators will phone or visit until all questions have been answered. To track down questionnaires not mailed back within two or three weeks of Census Day, they will make up to four calls at the home, leaving behind written requests for an appointment when nobody responds.

In about 10 percent of the United States, people do not have addresses that can be readily coded by computer to a specific block or census tract. These largely rural areas are enumerated by the "conventional" method. At every household, the Postal Service delivers an unaddressed questionnaire which instructs the respondent to hold the completed questionnaire until an enumerator picks it up several days later. In these areas, it is the enumerator who puts on the questionnaire, by hand, the proper census geographic coding, as described in the section on "Census Geography" (page 30).

The Census Bureau also has special procedures for finding people in institutions of all kinds and transients who could be missed in the questionnaire mailing to households—migratory workers, street people, and those in missions, motels, campgrounds, and so forth. On "T-night" (transient night), the evening before Census Day, Tuesday, April 1, 1980, there will be a special enumeration of people in hotels and motels that charge more than $4 a night, and in YMCAs, YWCAs, campgrounds, and the like. These people are enumerated on "individual census reports" which are sent back to the locality of their permanent addresses. "M-night" (mission night), scheduled for the Tuesday evening of the week following Census Day, seeks out people in mis-

DONT
WALK
FRANKFURTER
SAUSAGES

Special procedures are used to enumerate people who may be missed in the questionnaire mailing to households.

sions, flophouses, and places charging transients $4 or less a night, and those in local jails and detention centers which hold persons for 30 days or less. It also covers bus and railroad stations and other places where people without addresses are likely to be sleeping overnight. In the final census statistics, such people—like college students living in dormitories—are "allocated" to the area where they happen to be at the time of Census Day.

Another special enumeration procedure, called a Casual Count, is conducted only in large cities. It begins the week before follow-up operations and is designed to enumerate people without fixed addresses who may have been overlooked. Such persons can be found on street corners, in pool halls, bars, etc. One can assume that enumerating these folks is not the most sought-after job at the Census Bureau.

It is clear that a census by mail does not rely entirely on the Postal Service to deliver the forms and bring them back. The checking and follow-up procedures described above are an essential part of the census objective—find everybody.

The Minority Statistics Program

Since the 1970 Census, several new programs have been developed to increase coverage among those people who live in crowded urban areas, are members of a minority group, or may not be fluent in English. The Census Bureau has established the Minority Statistics Program to help convince minority groups that census statistics are valuable to them as well as to Washington and to obtain their cooperation in improving the quality of census data through more complete enumeration of minorities.

There are three components of this new program. Under the *National Services Program*, Census Bureau staff meet regularly with national minority organizations such as The Urban League, The League of United Latin American Citizens, and the Pacific Asian Coalition. Numerous meetings are held each year, at which Bureau officials give presentations on the uses of census statistics and hold discussions on how to improve census coverage.

A second component is the *Community Services Program*, under which the Census Bureau is involved with minority groups at the local level. This program is carried out by 200 community service specialists hired by the Bureau to enlist local minority groups' participation in the census. The goal of this grass roots program is to reach those people who are hardest to enumerate and who would most likely be missed entirely without this special effort.

Along with the above programs, the Census Bureau has set up three minority advisory committees to get advice on how to improve coverage among all minority groups. There are now Census Advisory committees for the Black Population, the Asian and Pacific Islander Population, and the Spanish Origin Population. There have also been a series of meetings with American Indian groups.

Critics say such efforts amount to little more than an attempt to placate minority groups that are critical of the Census Bureau's performance and that the effect of these new programs will be minimal because they do not go far enough. Still, they represent important and expensive additions to the government's efforts to locate and count all Americans, regardless of economic status or race. There is little doubt that the Census Bureau is sincere in its attempt to reduce the difference between white and minority response rates, a source not only of inaccurate data but also of national embarrassment.

Local review

An important new program for 1980—the local review program—should improve the count for minorities and whites alike. Under this program, the chief elected officials in each town, city, and county will be provided with preliminary dwelling-unit counts just prior to the census and will also be given population and housing counts as soon as possible after the census for each block or enumeration district in their municipalities. Thus, each municipality gets two chances to review the census counts before the census is over. The field offices of the Census Bureau will be kept open longer than in past censuses to review areas where the municipality provides evidence of an enumeration problem. Considering that every hour the huge field staff is kept on the job costs the government more than $200,000, even a few additional days will make this a very expensive program. The money will be well spent, however, if it increases community confidence in the census results and corrects problems that would not otherwise be found.

Processing the Census Results

After the census enumerators have reviewed the last questionnaire and checked out the last problem, the completed forms for the 1980 Census will be sent to one of three processing centers. In 1970, Jeffersonville, Indiana, was the sole site for processing questionnaires. Two temporary centers have been added to that permanent facility for 1980, one in Laguna Niguel, California, and one in New Orleans, Louisiana. At these centers, all questionnaires are microfilmed.

One copy of the microfilm is sent to the Census Bureau facility in Pittsburgh, Kansas. Any person may request from that office a certification that they personally were counted in any particular census. Thus a person about to become 65 years old but without any birth certificate may obtain proof of his or her age for social security purposes by showing that they were counted in the 1920 Census when they were five years old—another good reason to be counted in the census.

A second copy of the microfilm questionnaire is processed through a device called "FOSDIC," which optically senses the locations of the pencil marks the respondent made when filling out the form, and transfers the marks to computer tapes which are used to tabulate the data for each piece of census geography. Names and addresses are not read by the FOSDIC system and hence do not appear on these tapes. The result is several hundred reels of computer tape which contain all of the basic individual population and housing

The Census Bureau processing center at Jeffersonville, Indiana, is one of three to which completed questionnaires for the 1980 Census will be shipped for microfilming after checking at the 409 temporary census district offices.

data collected in the census.

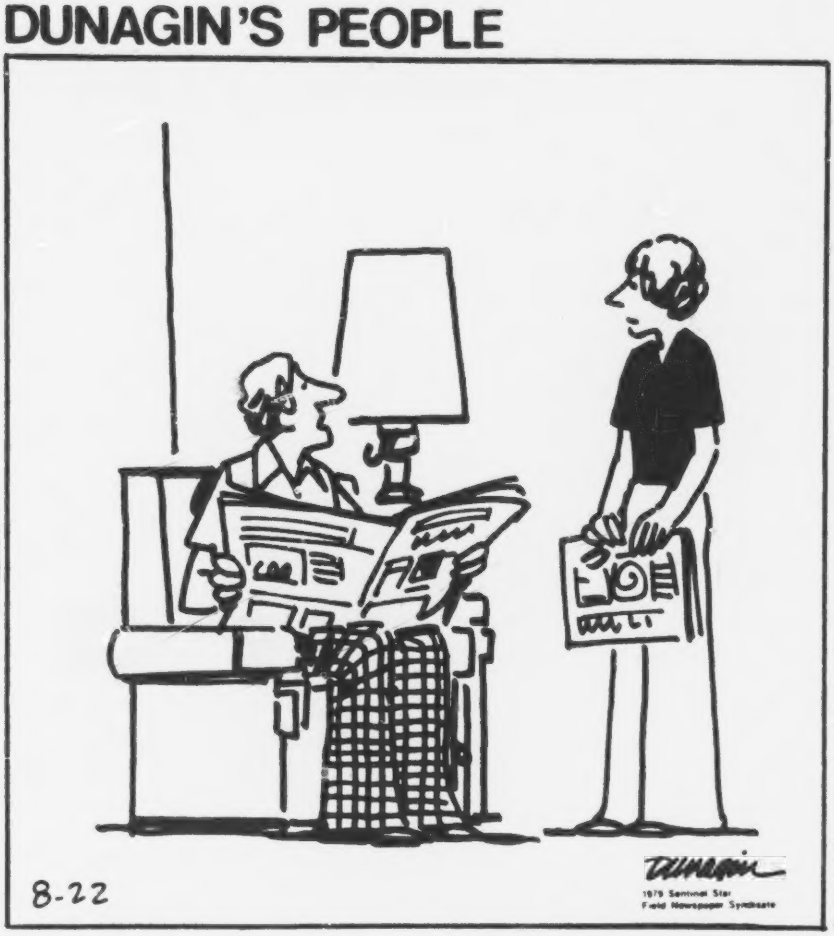
Even though these tapes contain no names, they are highly confidential, kept under guard, and are not released to any other federal agency or any public or private organization. Instead, they are further processed into aggregate data tapes and printed reports which can be, and are, made publicly available since the identity of any specific individual is then impossible to determine. In areas small enough to allow for the possibility that a single person's data might be inadvertently revealed by any tabulation, the data are suppressed. For example, in a census block with only three or four persons, the computer would suppress all data tabulations where the aggregate statistics might reveal one of the person's individual characteristics.

By Thursday, January 1, 1981, the Secretary of Commerce must deliver to the President official population counts for each state, thereby setting the number of members in the House of Representatives that will come from each state. Thus, the major portion of the census-taking process—delivering some 80 million questionnaires, collecting them, finding people not included in a mailed questionnaire, going through local review, processing the data, and creating the basic census tapes—will take only nine months. Most of the printed reports and publicly available computer tapes will be available within 12 to 18 months after the President has received the reapportionment figures.

Uses of the Census

Although reapportionment of representation in legislative bodies has never been the only purpose of the census, it has always been the first and most important purpose. Indeed, this Constitutional requirement is a fundamental part of American democracy because it is the basis for equal representation. Not only are the figures used at the national level to apportion Congressional seats among the states, but states use them to set district boundaries for individual Congressional representatives and state legislatures. County and city officials also use the data to set election district boundaries for local representatives.

The use of census statistics in government programs has grown enormously. Today, in addition to the federal reve-


DUNAGIN'S PEOPLE
8-22
Dunagin
1979 Sentinel Star Field Newspaper Syndicate

By Ralph Dunagin © Field Enterprises, Inc. 1979. Courtesy of Field Newspaper Syndicate.

"According to the Census Bureau, our state will gain two congressmen. . . . That's the price we pay for overpopulation."

As required by the Constitution, the decennial census provides the basis for fair reapportionment among the states of seats in the House of Representatives. It is also used to set district boundaries for state and local legislative bodies.

nue-sharing program, at least 100 other federal programs require the use of population estimates, based on the decennial census. They run the gamut from Agricultural Experiment Stations to Youth Recreational Services and even include a program for preventing hypertension. The use of population statistics derived from the census is also embedded in hundreds of state and federal laws which, while no money is attached, permit the locality to carry on certain functions, such as establish highway speed limits.

Probably the most extensive use of census statistics by all government agencies is for long-range planning. Public facilities such as highways, schools, water and sewer plants, and fire and police stations are not only expensive but are expected to be useful for at least 25 to 30 years. The need for these facilities now and in the future is usually determined by reference to past population trends and future projections from the most recent census.

But the fastest growing use of census statistics has been in the private sector.

There is hardly an American corporation that does not use census statistics in its product marketing, facilities planning, or personnel recruitment. Companies use the population characteristics to create new products for particular target groups. In the 1960s, the Ford Motor Company created the Mustang primarily for what was then a large and growing group of 18 to 24 year-olds, as revealed by the census.

The same type of information is useful when targeting advertising and promotion efforts. Pinpointing the location of the population group most likely to buy a product can avoid wasting advertising dollars. For example, advertising of products like tractor lawn mowers that appeal only to homeowners can be focused on cities and towns which have primarily owner-occupied dwelling units —information readily obtained from printed census reports. The same data can also be used to draw sales territories and set realistic sales goals.

In facilities planning, the determination that there are sufficient customers within the trading area of the store is usually done with the small area population and housing data available on census computer tapes. Prospective sites for an industrial plant can readily be evaluated using data on labor force characteristics from the census.

A new use of census summary data is for affirmative action. By reference to area labor force statistics by race and sex, it is possible to determine if there has been past discrimination at any facility. Court cases have been won on the basis of what census statistics showed.

Since there is no copyright on census data, they are repeated over and over in different publications by different authors until the original source is lost or forgotten. For example, the *Wall Street Journal* is often erroneously given credit for producing the unemployment statistics that appear periodically on its front page. They come from the Census Bureau's Current Population Survey, conducted monthly among a sample of some 50,000 households across the nation. Many people know how important demographic statistics are to every segment of our economy, but they may not know that the statistics come from the Census Bureau. The Bureau likes to tell the story of the person who wrote in 1970, "Why do we have to spend so much money to take the census? You could get all the figures from the World Almanac for free."

The 1980 Census Questionnaire

The 1980 questionnaire is similar to the one used in 1970 in that only a few basic questions are asked of every household and person. More information is asked of a sample of the population. The process is simpler for 1980, because only two forms of the questionnaire will be used—a short form for about 78 percent of the households and the long form for the remaining some 22 percent. In 1970 there were two versions of the long form, each given to a different sample of households.

For most areas of the country in 1980, a sample of one in every six households will receive the long form. In communities with populations below 2,500, the sampling will be on a one-in-two basis, in order to obtain more reliable statistics for revenue-sharing and other purposes.

The short questionnaire contains seven questions about population characteristics and 12 questions about housing. The long form contains these same questions plus an additional 20 housing and 26 population questions. The Census Bureau estimates that it takes about 15 minutes to complete the short questionnaire and 45 minutes for the long form.

During the planning for 1980, it was suggested that a question on income be added to the short questionnaire. Questions on income appeared only on the sample forms in 1970. In its early census tests, the Bureau found that such a question could be answered without difficulty. But several members of Congress, the press, and advisory groups suggested that such a sensitive question asked of every American would create undue burden and lower mail response rates for the short form. Because of this and other technical problems, the Bureau will be asking for income data only on a sample basis in 1980.

However, a question on Spanish origin or descent was moved from the sample questionnaire to a 100 percent basis in 1980, in part because Hispanic-Americans are becoming a larger proportion of the population.

Questions asked of everybody

Aside from the addition of the question on Spanish origin and a change in the wording of the household relationship item, the short form population questions remain basically the same as in 1970 with the exception of the question on race. This question has been modified and expanded for 1980. The specific reference to "color or race" has been replaced with the phrase, "Is this person—." The 1970 category "Negro or Black" has been reworded "Black or Negro." Separate categories for Vietnamese, Asian Indian, Guamanian, and Samoan have been added. The special questionnaire used for Alaska in 1970—in which the categories Hawaiian and Korean were replaced by Aleut and Eskimo—has been eliminated; now all four of those categories are on all questionnaires. As a result, the 1980 questionnaire will have 15 categories for this item instead of the nine used in 1970.

The 12 housing questions asked of all households in 1980 are significantly different from the 12 asked in 1970. The Census Bureau previously had asked for a telephone number where the respondent could be reached, and about kitchen facilities and a basement. For 1980, the kitchen facilities question and a telephone availability question have been moved to the sample questionnaire. The basement question did not yield sufficiently useful information in 1970 and was dropped. The request for a telephone number was used primarily for enumerator follow-up and has been moved to the back cover of the questionnaire for 1980. Previously there were three questions on the presence or absence of plumbing facilities; now there is only one. Also, newly worded questions attempt to elicit better information on the character and type of dwelling units. For example, there is now a separate question on condominiums, reflecting the large increase in that type of housing since 1970.

The questions about value, rent, and number of rooms in each dwelling are the same except that the impact of inflation shows up in the housing value and rents. In 1970, the highest house value asked was "$50,000 or more." In 1980, the highest value is "$200,000 or more."

"Head of household" eliminated

The census questionnaire mirrors changes in society. Just as the addition of a question on Spanish origin reflects the growing influence of Hispanics, the disappearance of the term "head of household" from the questionnaire reflects the growing influence of women in society. In 1980, each American household will be asked simply to indicate the relationship of other family members to the person who is listed in column one of the questionnaire. The respondent will choose which adult belongs in column one. In the past, the husband in married-couple families had been assumed to be the head. The new question on household relationship is worded as follows: "Start in this column with the household member (or one of the members) in whose name the home is owned or rented. If there is no such person, start in this column with any adult member."

This change is a significant one, perhaps the most significant change in the questionnaire from 1970. It was the product of considerable testing by the Census Bureau. A national survey of 940 households taken by the Bureau in September, 1975, interviewed husbands and wives separately about their preferences on the issue. Almost one-half of both husbands and wives said the husband was the head of the household; but fully one-third said the husband and wife were joint heads. Most of the remainder said the wife was the head.

Allowing the husband and wife to report as joint heads in questionnaire responses would create serious problems in identifying the household and family structure since the classifications of each household member must be made with regard to one reference person. There also would be problems in using household data because information such as age, education, employment status, occupation, and income of the household reference person or householder would be rendered meaningless if some husband-wife households contained joint heads while others reported individual heads. Also, tables showing family relationships would become impossible to create.

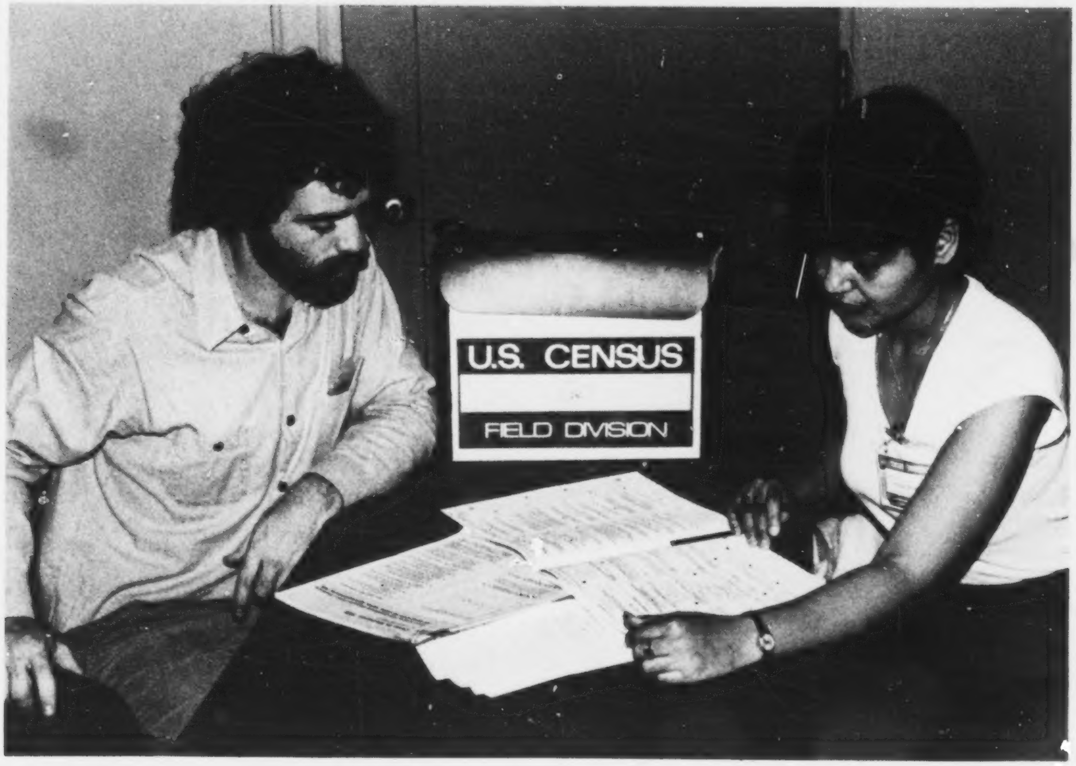
The Bureau's solution—to eliminate the term "head" entirely but to retain the concept of one family member as a point of reference, with individual families selecting that person—was tested successfully. Respondents had no more difficulty filling out the new form than with the old. Bureau officials do not believe that comparability with earlier data will be a problem; tabulations have been designed to facilitate comparison.

Questionnaire reproduced

Figure 2 (pages 18-23) presents a reproduction of the 1980 Census questionnaire with annotations pointing out changes from 1970 and other noteworthy details. The questionnaire was obtained from the Bureau of the Census; editing and annotations were done by the staff of *American Demographics* magazine and are reprinted here with permission.

This version of the questionnaire is given to a sample of the population. The first seven population questions are also asked of every American, and housing questions H1. through H12. are asked of every household. The rest of the questions are asked on a sample basis only.

The first question appears on the cover of both the short form (which has only the 100 percent questions) and the long form (the sample questionnaire). The question is: "What is the name of each person who was living here on Tuesday, April 1, 1980, or who was staying or visiting here and had no other home?" (Visitors with home addresses elsewhere are enumerated at that address.) Information from Question 1 is



used by the Census Bureau for follow-up if other questions are not answered. Names provided from this question are for Bureau follow-up purposes only and are not made public. As a standard procedure, a call will be made to every address that lists seven or more persons to be sure everyone has been counted. The questionnaire has spaces for only seven persons in each household.

The questionnaire begins with a pledge of confidentiality, Spanish-language instructions for those who wish to order a Spanish questionnaire, and the following message from the Census Bureau director:

"We must, from time-to-time, take stock of ourselves as a people if our Nation is to meet successfully the many national and local challenges we face. This is the purpose of the 1980 Census.

The essential need for a population census was recognized almost 200 years ago when our Constitution was written. As provided by article I, the first census was conducted in 1790 and one has been taken every 10 years since then.

The law under which the census is taken protects the confidentiality of your answers. For the next 72 years—or until April 1, 2052—only sworn census workers have access to the individual records, and no one else may see them.

Your answers, when combined with the answers from other people, will provide the statistical figures needed by public and private groups, schools, business and industry, and federal, state and local governments across the country. These figures will help all sectors of American society understand how our population and housing are changing. In this way, we can deal more effectively with today's problems and work toward a better future for all of us.

The census is a vitally important national activity. Please do your part by filling out this census form accurately and completely. If you mail it back promptly in the enclosed postage-paid envelope, it will save the expense and inconvenience of a census taker having to visit you.

Thank you for your cooperation."

Figure 2. The 1980 Questionnaire/Annotated

2. provides information on type of household (husband/wife, other type of family, or single person households) and the number of persons in the household. Because of changes in society since 1970, the concept of household "head" has been replaced with that of a reference person in whose name the dwelling unit is owned or rented. This person is identified in column one. This key change means data will not be exactly comparable to "male-headed" or "female-headed" household data from the 1970 Census, but it will be easy to identify families and other types of households. In many tabulations characteristics will be shown for both husband and wife where they were shown previously only for the head of family households.

The questionnaire has space for up to seven household members to provide answers. We show only column 1. The other columns are identical except for question 2, which asks relationship. In question 2, columns 2 through 7 have the following language instead of the "Start in this column" language: "If relative of person in column 1: Husband/wife; Son/daughter; Brother/sister; Father/mother; Other relative (specify). If not related to person in column 1: Roomer, boarder; Partner, roommate; Paid employee; Other nonrelative (specify)."

Two of the categories are new: "Partner, roommate" and "Paid employee." The first was added to obtain statistics on the growing number of people who live together without being married.

3. same as in 1970.

4. expands the possible answers about race from nine in 1970 to 15. As a result we can expect a few Samoans to turn up in places like Kansas City, just because that alternative is listed. The expansion is the result of growing ethnic awareness, but note that the word "race" does not appear.

5. same as in 1970.

6. same as in 1970.

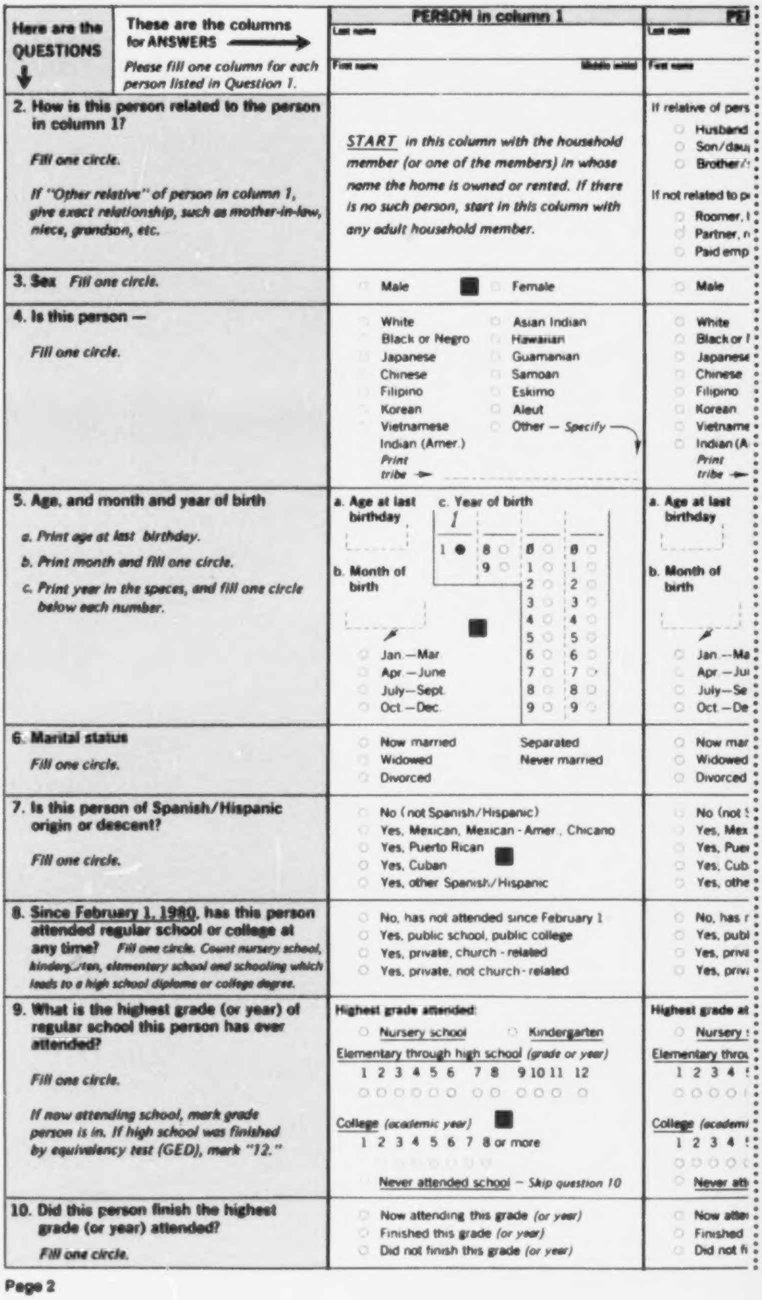
7. for the first time asks all Americans a single question about Spanish origin. These data will not be comparable with previous censuses. In 1970, this question was asked of a maximum of 15 percent of the population, and the data were tabulated differently for different regions of the country. This question ends the population questions asked of all Americans. The next three questions appear on the long form questionnaire only.

8. similar to 1970, but what was previously called "parochial" schools is now called "church related."

9. similar to 1970, but the highest college level asked for then was six or more years.

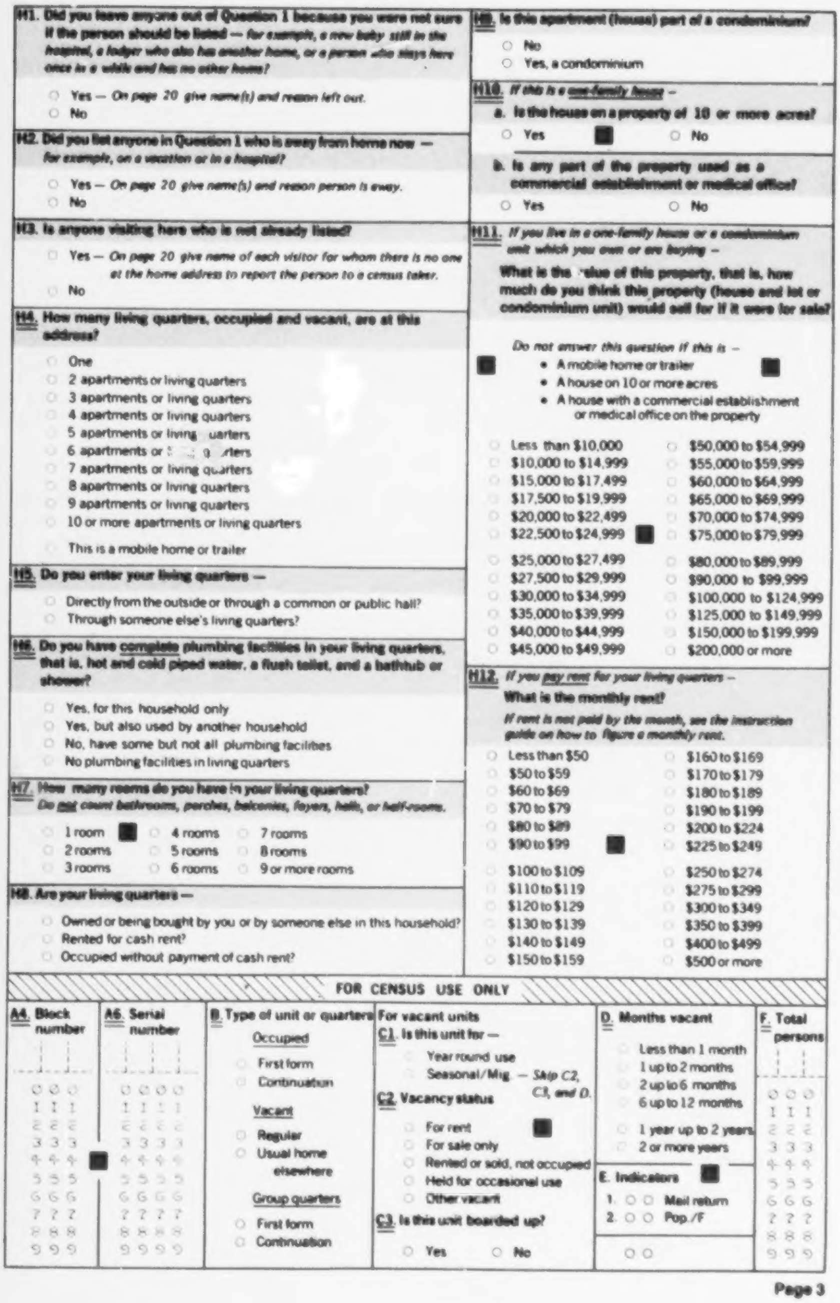
10. same as in 1970.

Note: Because of our format we have reduced the size of the questionnaire by about 40 percent and omitted certain instructions to respondents and Census Bureau use boxes. The census questionnaire also will have blue shading, not gray.



Here are the QUESTIONS ↓ **These are the columns for ANSWERS** ⟶ *Please fill one column for each person listed in Question 1.*	**PERSON in column 1** Last name First name Middle initial	**PE** Last name First name
2. How is this person related to the person in column 1? *Fill one circle.* *If "Other relative" of person in column 1, give exact relationship, such as mother-in-law, niece, grandson, etc.*	*START in this column with the household member (or one of the members) in whose name the home is owned or rented. If there is no such person, start in this column with any adult household member.*	If relative of pers ○ Husband ○ Son/dau ○ Brother/ If not related to p ○ Roomer, l ○ Partner, r ○ Paid emp
3. Sex *Fill one circle.*	○ Male ○ Female	○ Male
4. Is this person — *Fill one circle.*	○ White ○ Black or Negro ○ Japanese ○ Chinese ○ Filipino ○ Korean ○ Vietnamese ○ Indian (Amer.) *Print tribe* → ------ ○ Asian Indian ○ Hawaiian ○ Guamanian ○ Samoan ○ Eskimo ○ Aleut ○ Other — *Specify*	○ White ○ Black or I ○ Japanese ○ Chinese ○ Filipino ○ Korean ○ Vietname ○ Indian (A *Print tribe* →
5. Age, and month and year of birth *a. Print age at last birthday.* *b. Print month and fill one circle.* *c. Print year in the spaces, and fill one circle below each number.*	**a. Age at last birthday** **b. Month of birth** ○ Jan.—Mar. ○ Apr.—June ○ July—Sept. ○ Oct.—Dec. c. Year of birth 1 1 ● 8 ○ 9 ○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○ 0 ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9 ○	**a. Age at last birthday** **b. Month of birth** ○ Jan.—Ma ○ Apr.—Ju ○ July—Se ○ Oct.—De
6. Marital status *Fill one circle.*	○ Now married ○ Widowed ○ Divorced ○ Separated ○ Never married	○ Now mar ○ Widowed ○ Divorced
7. Is this person of Spanish/Hispanic origin or descent? *Fill one circle.*	○ No (not Spanish/Hispanic) ○ Yes, Mexican, Mexican-Amer., Chicano ○ Yes, Puerto Rican ○ Yes, Cuban ○ Yes, other Spanish/Hispanic	○ No (not ○ Yes, Mex ○ Yes, Puer ○ Yes, Cub ○ Yes, othe
8. Since February 1, 1980, has this person attended regular school or college at any time? *Fill one circle. Count nursery school, kindergarten, elementary school and schooling which leads to a high school diploma or college degree.*	○ No, has not attended since February 1 ○ Yes, public school, public college ○ Yes, private, church-related ○ Yes, private, not church-related	○ No, has r ○ Yes, publ ○ Yes, priva ○ Yes, priva
9. What is the highest grade (or year) of regular school this person has ever attended? *Fill one circle.* *If now attending school, mark grade person is in. If high school was finished by equivalency test (GED), mark "12."*	Highest grade attended: ○ Nursery school ○ Kindergarten Elementary through high school *(grade or year)* 1 2 3 4 5 6 7 8 9 10 11 12 ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ College *(academic year)* 1 2 3 4 5 6 7 8 or more ○ ○ ○ ○ ○ ○ ○ ○ ○ Never attended school — *Skip question 10*	Highest grade at ○ Nursery Elementary throu 1 2 3 4 ○ ○ ○ ○ College *(academi* 1 2 3 4 ○ ○ ○ ○ ○ Never att
10. Did this person finish the highest grade (or year) attended? *Fill one circle.*	○ Now attending this grade *(or year)* ○ Finished this grade *(or year)* ○ Did not finish this grade *(or year)*	○ Now atte ○ Finished ○ Did not fi

Page 2


H1. Did you leave anyone out of Question 1 because you were not sure if the person should be listed — *for example, a new baby still in the hospital, a lodger who also has another home, or a person who stays here once in a while and has no other home?*

○ Yes — *On page 20 give name(s) and reason left out.*
○ No

H2. Did you list anyone in Question 1 who is away from home now — *for example, on a vacation or in a hospital?*

○ Yes — *On page 20 give name(s) and reason person is away.*
○ No

H3. Is anyone visiting here who is not already listed?

○ Yes — *On page 20 give name of each visitor for whom there is no one at the home address to report the person to a census taker.*
○ No

H4. How many living quarters, occupied and vacant, are at this address?

○ One
○ 2 apartments or living quarters
○ 3 apartments or living quarters
○ 4 apartments or living quarters
○ 5 apartments or living quarters
○ 6 apartments or [illegible] quarters
○ 7 apartments or living quarters
○ 8 apartments or living quarters
○ 9 apartments or living quarters
○ 10 or more apartments or living quarters

○ This is a mobile home or trailer

H5. Do you enter your living quarters —

○ Directly from the outside or through a common or public hall?
○ Through someone else's living quarters?

H6. Do you have complete plumbing facilities in your living quarters, that is, hot and cold piped water, a flush toilet, and a bathtub or shower?

○ Yes, for this household only
○ Yes, but also used by another household
○ No, have some but not all plumbing facilities
○ No plumbing facilities in living quarters

H7. How many rooms do you have in your living quarters?
Do not count bathrooms, porches, balconies, foyers, halls, or half-rooms.

○ 1 room
○ 2 rooms
○ 3 rooms
○ 4 rooms
○ 5 rooms
○ 6 rooms
○ 7 rooms
○ 8 rooms
○ 9 or more rooms

H8. Are your living quarters —

○ Owned or being bought by you or by someone else in this household?
○ Rented for cash rent?
○ Occupied without payment of cash rent?

H9. Is this apartment (house) part of a condominium?

○ No
○ Yes, a condominium

H10. *If this is a one-family house —*

a. Is the house on a property of 10 or more acres?

○ Yes ○ No

b. Is any part of the property used as a commercial establishment or medical office?

○ Yes ○ No

H11. *If you live in a one-family house or a condominium unit which you own or are buying —*

What is the value of this property, that is, how much do you think this property (house and lot or condominium unit) would sell for if it were for sale?

Do not answer this question if this is —
- A mobile home or trailer
- A house on 10 or more acres
- A house with a commercial establishment or medical office on the property

○ Less than $10,000
○ $10,000 to $14,999
○ $15,000 to $17,499
○ $17,500 to $19,999
○ $20,000 to $22,499
○ $22,500 to $24,999
○ $25,000 to $27,499
○ $27,500 to $29,999
○ $30,000 to $34,999
○ $35,000 to $39,999
○ $40,000 to $44,999
○ $45,000 to $49,999
○ $50,000 to $54,999
○ $55,000 to $59,999
○ $60,000 to $64,999
○ $65,000 to $69,999
○ $70,000 to $74,999
○ $75,000 to $79,999
○ $80,000 to $89,999
○ $90,000 to $99,999
○ $100,000 to $124,999
○ $125,000 to $149,999
○ $150,000 to $199,999
○ $200,000 or more

H12. *If you pay rent for your living quarters —*

What is the monthly rent?

If rent is not paid by the month, see the instruction guide on how to figure a monthly rent.

○ Less than $50
○ $50 to $59
○ $60 to $69
○ $70 to $79
○ $80 to $89
○ $90 to $99
○ $100 to $109
○ $110 to $119
○ $120 to $129
○ $130 to $139
○ $140 to $149
○ $150 to $159
○ $160 to $169
○ $170 to $179
○ $180 to $189
○ $190 to $199
○ $200 to $224
○ $225 to $249
○ $250 to $274
○ $275 to $299
○ $300 to $349
○ $350 to $399
○ $400 to $499
○ $500 or more

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A4. Block number

0 0 0
1 1 1
2 2 2
3 3 3
4 4 4
5 5 5
6 6 6
7 7 7
8 8 8
9 9 9

A6. Serial number

0 0 0 0
1 1 1 1
2 2 2 2
3 3 3 3
4 4 4 4
5 5 5 5
6 6 6 6
7 7 7 7
8 8 8 8
9 9 9 9

B. Type of unit or quarters

Occupied
○ First form
○ Continuation

Vacant
○ Regular
○ Usual home elsewhere

Group quarters
○ First form
○ Continuation

For vacant units

C1. Is this unit for —

○ Year round use
○ Seasonal/Mig. — *Skip C2, C3, and D.*

C2. Vacancy status

○ For rent
○ For sale only
○ Rented or sold, not occupied
○ Held for occasional use
○ Other vacant

C3. Is this unit boarded up?

○ Yes ○ No

D. Months vacant

○ Less than 1 month
○ 1 up to 2 months
○ 2 up to 6 months
○ 6 up to 12 months
○ 1 year up to 2 years
○ 2 or more years

E. Indicators

1. ○ ○ Mail return
2. ○ ○ Pop./F

○ ○

F. Total persons

0 0 0
1 1 1
2 2 2
3 3 3
4 4 4
5 5 5
6 6 6
7 7 7
8 8 8
9 9 9

Page 3

H1-H3. the housing part of both the 100 percent and sample questionnaires starts with these three questions to make sure that everyone in the household was counted.

H4. same as in 1970. This question is asked so that census personnel can be sure that all units at an address are enumerated. Question H13 provides superior data on the number of dwelling units in the structure. Like the first three housing questions, H4 is intended to check coverage.

H5. has the objective of making certain the respondent occupies a bona fide dwelling unit, not just a few rooms in someone else's house.

H6. one of the few questions left from a series of questions in the 1970 Census which attempted to measure housing quality.

H7. same as in 1970.

H8. same as in 1970.

H9. for the first time poses a separate question on condominiums. The term "cooperative" also appeared on the test questionnaires but was misunderstood by many respondents.

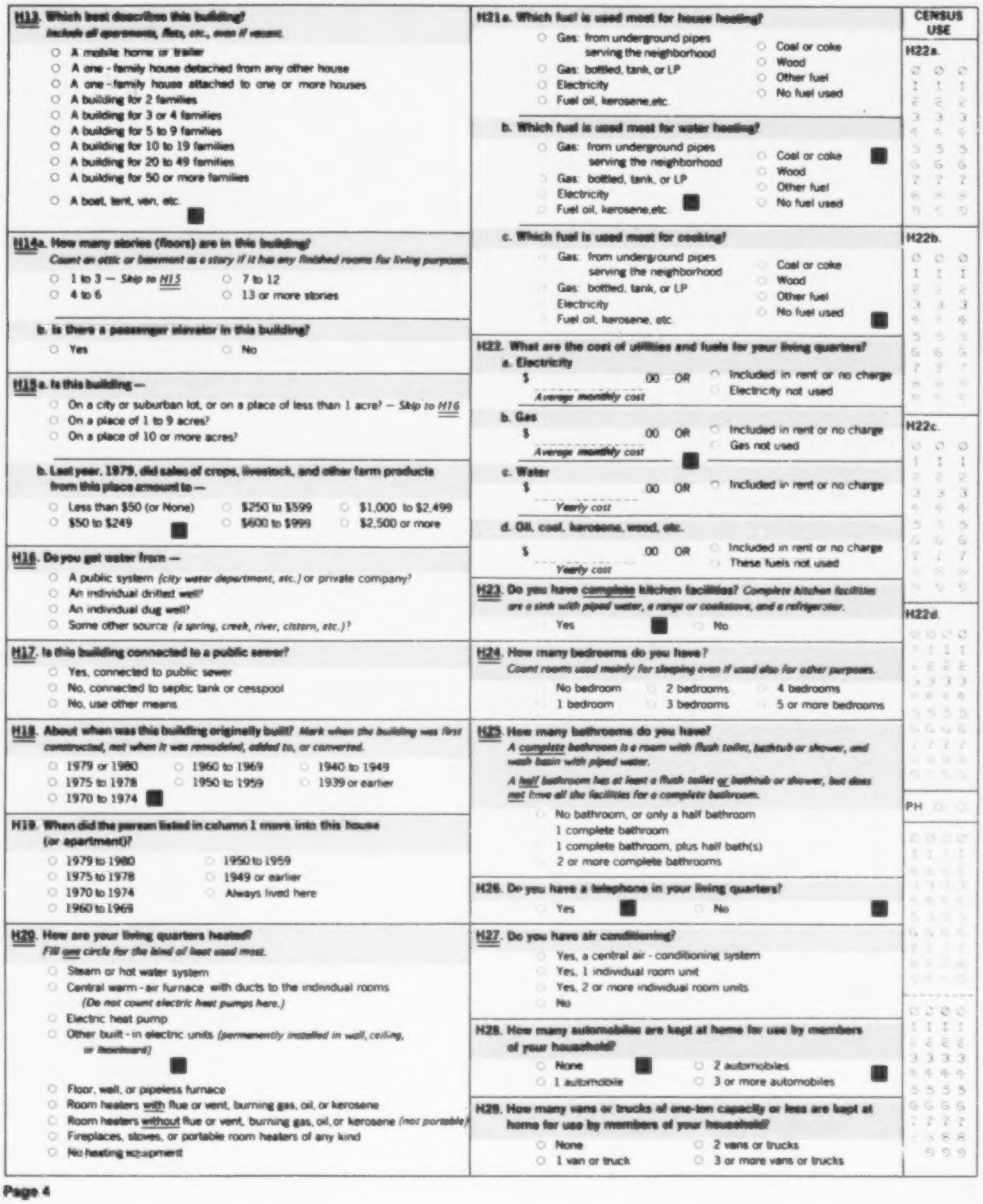
H10. separates farmhouses, estates, and partly commercial structures from single family dwelling units. Value is not tabulated for these types of units.

H11. asks value. There are 24 categories instead of the 11 in 1970, when the highest value was only $50,000 or more.

H12. also shows the impact of inflation. The highest interval in 1970 was $300 or more. It is now $500 or more, and 24 categories appear instead of the former 14.

H12 ends the housing questions asked of all Americans. The Census Bureau estimates it takes 15 minutes to answer the 19 population and housing questions on the short questionnaire, while the remaining questions add another 30 minutes.

Figure 2. The 1980 Census Questionnaire/Annotated (cont.)



H13. Which best describes this building?
Include all apartments, flats, etc., even if vacant.
○ A mobile home or trailer
○ A one-family house detached from any other house
○ A one-family house attached to one or more houses
○ A building for 2 families
○ A building for 3 or 4 families
○ A building for 5 to 9 families
○ A building for 10 to 19 families
○ A building for 20 to 49 families
○ A building for 50 or more families
○ A boat, tent, van, etc.

H14a. How many stories (floors) are in this building?
Count an attic or basement as a story if it has any finished rooms for living purposes.
○ 1 to 3 — *Skip to H15* ○ 7 to 12
○ 4 to 6 ○ 13 or more stories

b. Is there a passenger elevator in this building?
○ Yes ○ No

H15a. Is this building —
○ On a city or suburban lot, or on a place of less than 1 acre? — *Skip to H16*
○ On a place of 1 to 9 acres?
○ On a place of 10 or more acres?

b. Last year, 1979, did sales of crops, livestock, and other farm products from this place amount to —
○ Less than $50 (or None) ○ $250 to $599 ○ $1,000 to $2,499
○ $50 to $249 ○ $600 to $999 ○ $2,500 or more

H16. Do you get water from —
○ A public system *(city water department, etc.)* or private company?
○ An individual drilled well?
○ An individual dug well?
○ Some other source *(a spring, creek, river, cistern, etc.)*?

H17. Is this building connected to a public sewer?
○ Yes, connected to public sewer
○ No, connected to septic tank or cesspool
○ No, use other means

H18. About when was this building originally built? *Mark when the building was first constructed, not when it was remodeled, added to, or converted.*
○ 1979 or 1980 ○ 1960 to 1969 ○ 1940 to 1949
○ 1975 to 1978 ○ 1950 to 1959 ○ 1939 or earlier
○ 1970 to 1974

H19. When did the person listed in column 1 move into this house (or apartment)?
○ 1979 to 1980 ○ 1950 to 1959
○ 1975 to 1978 ○ 1949 or earlier
○ 1970 to 1974 ○ Always lived here
○ 1960 to 1969

H20. How are your living quarters heated?
Fill one circle for the kind of heat used most.
○ Steam or hot water system
○ Central warm-air furnace with ducts to the individual rooms
(Do not count electric heat pumps here.)
○ Electric heat pump
○ Other built-in electric units *(permanently installed in wall, ceiling, or baseboard)*
○ Floor, wall, or pipeless furnace
○ Room heaters with flue or vent, burning gas, oil, or kerosene
○ Room heaters without flue or vent, burning gas, oil, or kerosene *(not portable)*
○ Fireplaces, stoves, or portable room heaters of any kind
○ No heating equipment

H21a. Which fuel is used most for house heating?
○ Gas: from underground pipes serving the neighborhood ○ Coal or coke
○ Gas: bottled, tank, or LP ○ Wood
○ Electricity ○ Other fuel
○ Fuel oil, kerosene, etc. ○ No fuel used

b. Which fuel is used most for water heating?
○ Gas: from underground pipes serving the neighborhood ○ Coal or coke
○ Gas: bottled, tank, or LP ○ Wood
○ Electricity ○ Other fuel
○ Fuel oil, kerosene, etc. ○ No fuel used

c. Which fuel is used most for cooking?
○ Gas: from underground pipes serving the neighborhood ○ Coal or coke
○ Gas: bottled, tank, or LP ○ Wood
○ Electricity ○ Other fuel
○ Fuel oil, kerosene, etc. ○ No fuel used

H22. What are the cost of utilities and fuels for your living quarters?

a. Electricity
$ ______ .00 OR ○ Included in rent or no charge
Average monthly cost ○ Electricity not used

b. Gas
$ ______ .00 OR ○ Included in rent or no charge
Average monthly cost ○ Gas not used

c. Water
$ ______ .00 OR ○ Included in rent or no charge
Yearly cost

d. Oil, coal, kerosene, wood, etc.
$ ______ .00 OR ○ Included in rent or no charge
Yearly cost ○ These fuels not used

H23. Do you have complete kitchen facilities? *Complete kitchen facilities are a sink with piped water, a range or cookstove, and a refrigerator.*
○ Yes ○ No

H24. How many bedrooms do you have?
Count rooms used mainly for sleeping even if used also for other purposes.
○ No bedroom ○ 2 bedrooms ○ 4 bedrooms
○ 1 bedroom ○ 3 bedrooms ○ 5 or more bedrooms

H25. How many bathrooms do you have?
A complete bathroom is a room with flush toilet, bathtub or shower, and wash basin with piped water.
A half bathroom has at least a flush toilet or bathtub or shower, but does not have all the facilities for a complete bathroom.
○ No bathroom, or only a half bathroom
○ 1 complete bathroom
○ 1 complete bathroom, plus half bath(s)
○ 2 or more complete bathrooms

H26. Do you have a telephone in your living quarters?
○ Yes ○ No

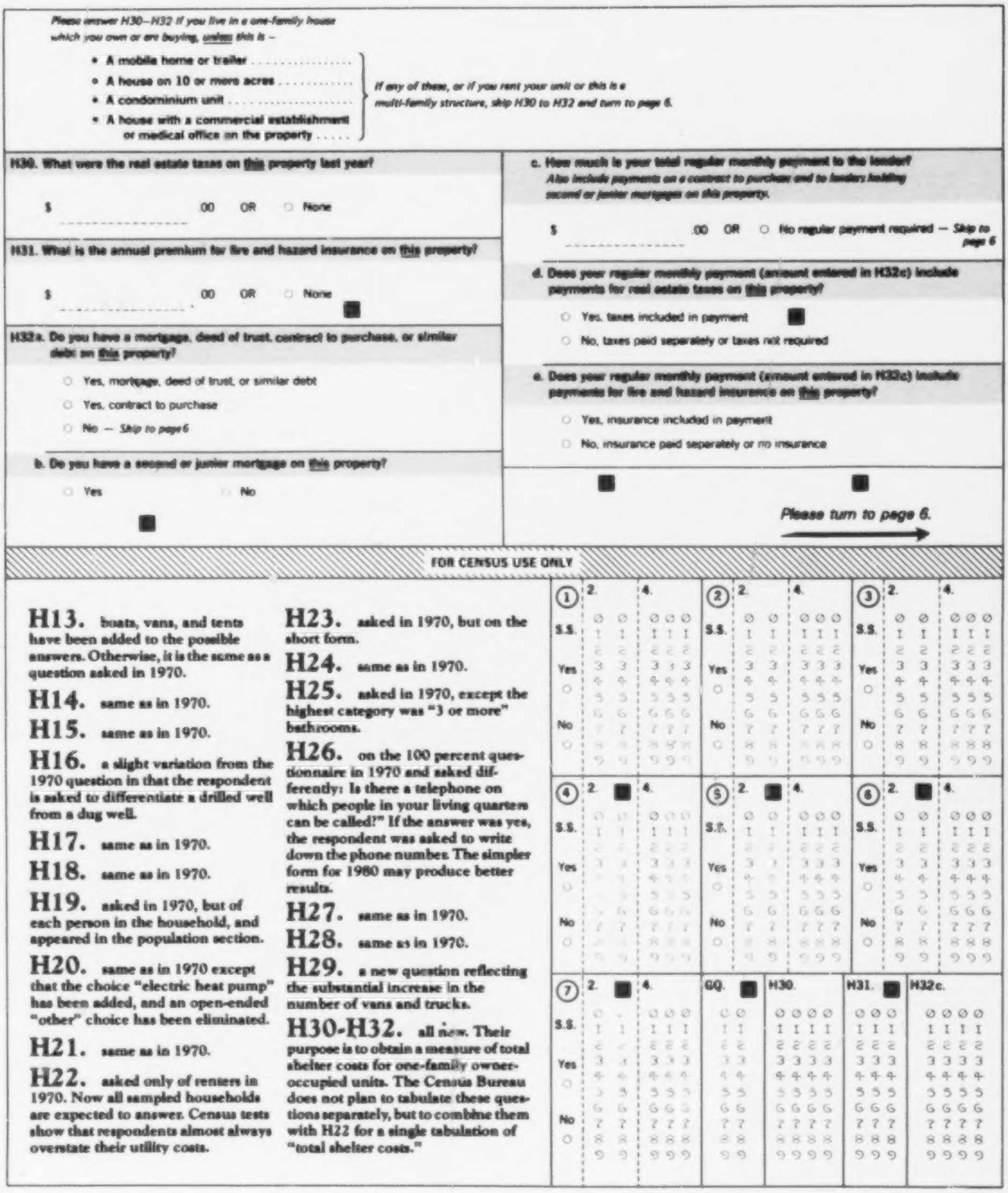
H27. Do you have air conditioning?
○ Yes, a central air-conditioning system
○ Yes, 1 individual room unit
○ Yes, 2 or more individual room units
○ No

H28. How many automobiles are kept at home for use by members of your household?
○ None ○ 2 automobiles
○ 1 automobile ○ 3 or more automobiles

H29. How many vans or trucks of one-ton capacity or less are kept at home for use by members of your household?
○ None ○ 2 vans or trucks
○ 1 van or truck ○ 3 or more vans or trucks

CENSUS USE
H22a.
H22b.
H22c.
H22d.
PH ○ ○

Page 4



Please answer H30–H32 if you live in a one-family house which you own or are buying, unless this is –

- A mobile home or trailer
- A house on 10 or more acres
- A condominium unit
- A house with a commercial establishment or medical office on the property

If any of these, or if you rent your unit or this is a multi-family structure, skip H30 to H32 and turn to page 6.

H30. What were the real estate taxes on this property last year?

$ .... .00 OR ☐ None

H31. What is the annual premium for fire and hazard insurance on this property?

$ .... .00 OR ☐ None

H32a. Do you have a mortgage, deed of trust, contract to purchase, or similar debt on this property?

○ Yes, mortgage, deed of trust, or similar debt

○ Yes, contract to purchase

○ No — *Skip to page 6*

b. Do you have a second or junior mortgage on this property?

○ Yes ○ No

c. How much is your total regular monthly payment to the lender?
Also include payments on a contract to purchase and to lenders holding second or junior mortgages on this property.

$ .... .00 OR ○ No regular payment required — *Skip to page 6*

d. Does your regular monthly payment (amount entered in H32c) include payments for real estate taxes on this property?

○ Yes, taxes included in payment

○ No, taxes paid seperately or taxes not required

e. Does your regular monthly payment (amount entered in H32c) include payments for fire and hazard insurance on this property?

○ Yes, insurance included in payment

○ No, insurance paid seperately or no insurance

Please turn to page 6. →

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H13. boats, vans, and tents have been added to the possible answers. Otherwise, it is the same as a question asked in 1970.

H14. same as in 1970.

H15. same as in 1970.

H16. a slight variation from the 1970 question in that the respondent is asked to differentiate a drilled well from a dug well.

H17. same as in 1970.

H18. same as in 1970.

H19. asked in 1970, but of each person in the household, and appeared in the population section.

H20. same as in 1970 except that the choice "electric heat pump" has been added, and an open-ended "other" choice has been eliminated.

H21. same as in 1970.

H22. asked only of renters in 1970. Now all sampled households are expected to answer. Census tests show that respondents almost always overstate their utility costs.

H23. asked in 1970, but on the short form.

H24. same as in 1970.

H25. asked in 1970, except the highest category was "3 or more" bathrooms.

H26. on the 100 percent questionnaire in 1970 and asked differently: Is there a telephone on which people in your living quarters can be called?" If the answer was yes, the respondent was asked to write down the phone number. The simpler form for 1980 may produce better results.

H27. same as in 1970.

H28. same as in 1970.

H29. a new question reflecting the substantial increase in the number of vans and trucks.

H30-H32. all new. Their purpose is to obtain a measure of total shelter costs for one-family owner-occupied units. The Census Bureau does not plan to tabulate these questions separately, but to combine them with H22 for a single tabulation of "total shelter costs."

① 2. 4. S.S. Yes ○ No ○

② 2. 4. S.S. Yes ○ No ○

③ 2. 4. S.S. Yes ○ No ○

④ 2. 4. S.S. Yes ○ No ○

⑤ 2. 4. S.S. Yes ○ No ○

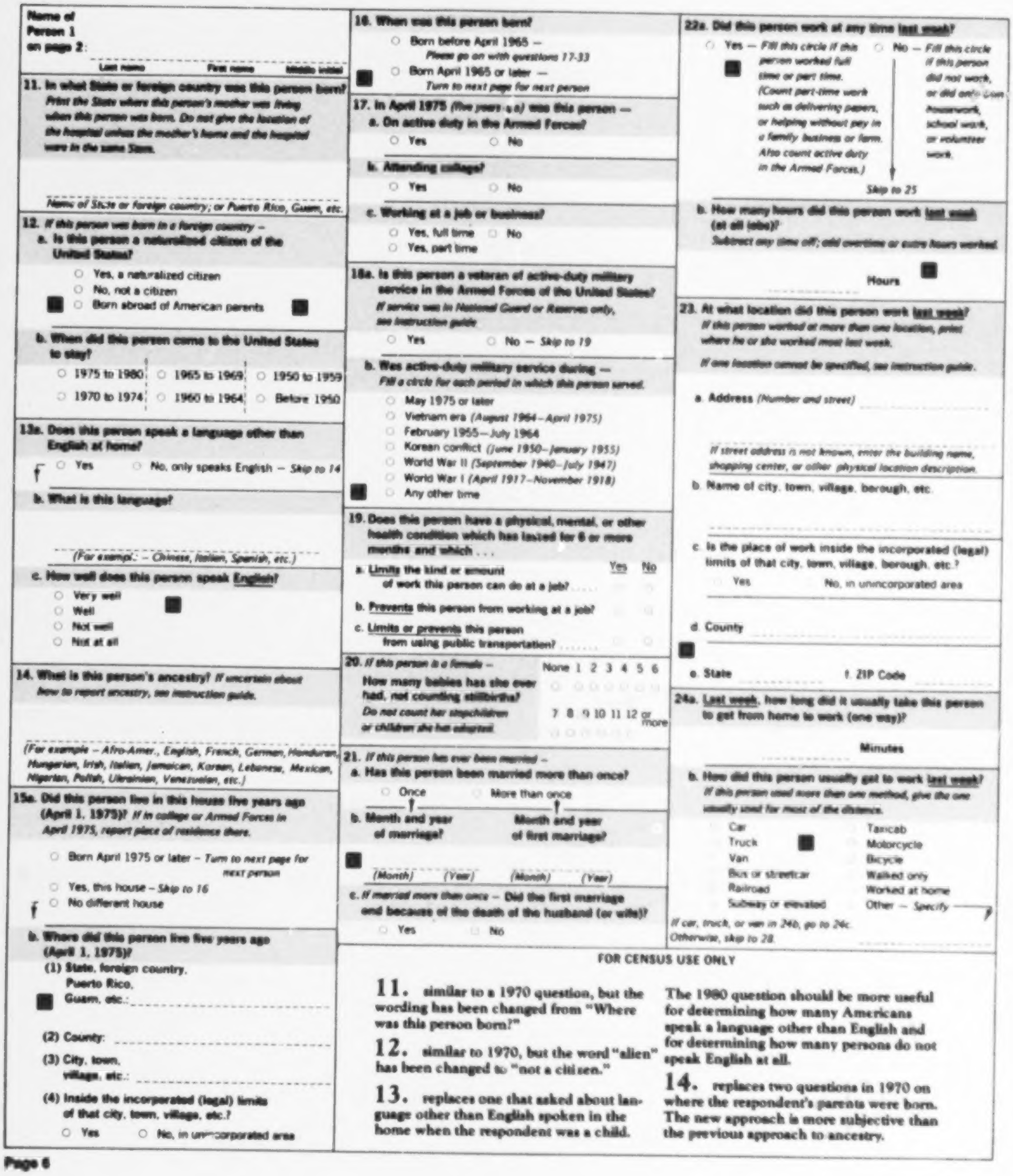
⑥ 2. 4. S.S. Yes ○ No ○

⑦ 2. 4. S.S. Yes ○ No ○

GQ. H30. H31. H32c.

Page 5

Figure 2. The 1980 Census Questionnaire/Annotated (cont.)



Name of Person 1 on page 2: ____________
Last name — First name — Middle initial

11. In what State or foreign country was this person born? *Print the State where this person's mother was living when this person was born. Do not give the location of the hospital unless the mother's home and the hospital were in the same State.*

____
Name of State or foreign country; or Puerto Rico, Guam, etc.

12. *If this person was born in a foreign country –*
a. Is this person a naturalized citizen of the United States?
○ Yes, a naturalized citizen
○ No, not a citizen
○ Born abroad of American parents

b. When did this person come to the United States to stay?
○ 1975 to 1980 ○ 1965 to 1969 ○ 1950 to 1959
○ 1970 to 1974 ○ 1960 to 1964 ○ Before 1950

13a. Does this person speak a language other than English at home?
○ Yes ○ No, only speaks English – *Skip to 14*

b. What is this language?
____
(For example – Chinese, Italian, Spanish, etc.)

c. How well does this person speak English?
○ Very well
○ Well
○ Not well
○ Not at all

14. What is this person's ancestry? *If uncertain about how to report ancestry, see instruction guide.*

____
(For example – Afro-Amer., English, French, German, Honduran, Hungarian, Irish, Italian, Jamaican, Korean, Lebanese, Mexican, Nigerian, Polish, Ukrainian, Venezuelan, etc.)

15a. Did this person live in this house five years ago (April 1, 1975)? *If in college or Armed Forces in April 1975, report place of residence there.*
○ Born April 1975 or later – *Turn to next page for next person*
○ Yes, this house – *Skip to 16*
○ No different house

b. Where did this person live five years ago (April 1, 1975)?
(1) State, foreign country, Puerto Rico, Guam, etc.: ____________
(2) County: ____________
(3) City, town, village, etc.: ____________
(4) Inside the incorporated (legal) limits of that city, town, village, etc.?
○ Yes ○ No, in unincorporated area

16. When was this person born?
○ Born before April 1965 – *Please go on with questions 17-33*
○ Born April 1965 or later – *Turn to next page for next person*

17. In April 1975 *(five years ago)* **was this person –**
a. On active duty in the Armed Forces?
○ Yes ○ No
b. Attending college?
○ Yes ○ No
c. Working at a job or business?
○ Yes, full time ○ No
○ Yes, part time

18a. Is this person a veteran of active-duty military service in the Armed Forces of the United States? *If service was in National Guard or Reserves only, see instruction guide.*
○ Yes ○ No – *Skip to 19*

b. Was active-duty military service during – *Fill a circle for each period in which this person served.*
○ May 1975 or later
○ Vietnam era *(August 1964–April 1975)*
○ February 1955–July 1964
○ Korean conflict *(June 1950–January 1955)*
○ World War II *(September 1940–July 1947)*
○ World War I *(April 1917–November 1918)*
○ Any other time

19. Does this person have a physical, mental, or other health condition which has lasted for 6 or more months and which . . .

	Yes	No
a. Limits the kind or amount of work this person can do at a job?	○	○
b. Prevents this person from working at a job?	○	○
c. Limits or prevents this person from using public transportation?	○	○

20. *If this person is a female –*
How many babies has she ever had, not counting stillbirths? *Do not count her stepchildren or children she has adopted*

None	1	2	3	4	5	6
○	○	○	○	○	○	○
7	8	9	10	11	12 or more	
○	○	○	○	○	○	

21. *If this person has ever been married –*
a. Has this person been married more than once?
○ Once ○ More than once
b. Month and year of marriage? — **Month and year of first marriage?**
(Month) *(Year)* *(Month)* *(Year)*
c. *If married more than once* – **Did the first marriage end because of the death of the husband (or wife)?**
○ Yes ○ No

22a. Did this person work at any time last week?
○ Yes – *Fill this circle if this person worked full time or part time. (Count part-time work such as delivering papers, or helping without pay in a family business or farm. Also count active duty in the Armed Forces.)*
○ No – *Fill this circle if this person did not work, or did only own housework, school work, or volunteer work.* — *Skip to 25*

b. How many hours did this person work last week (at all jobs)? *Subtract any time off; add overtime or extra hours worked.*
____________ Hours

23. At what location did this person work last week? *If this person worked at more than one location, print where he or she worked most last week.*
If one location cannot be specified, see instruction guide.
a. Address *(Number and street)* ____________
If street address is not known, enter the building name, shopping center, or other physical location description.
b. Name of city, town, village, borough, etc. ____________
c. Is the place of work inside the incorporated (legal) limits of that city, town, village, borough, etc.?
○ Yes ○ No, in unincorporated area
d. County ____________
e. State ____________ f. ZIP Code ____________

24a. Last week, how long did it usually take this person to get from home to work (one way)?
____________ Minutes

b. How did this person usually get to work last week? *If this person used more than one method, give the one usually used for most of the distance.*
○ Car ○ Taxicab
○ Truck ○ Motorcycle
○ Van ○ Bicycle
○ Bus or streetcar ○ Walked only
○ Railroad ○ Worked at home
○ Subway or elevated ○ Other – *Specify*
If car, truck, or van in 24b, go to 24c. Otherwise, skip to 28.

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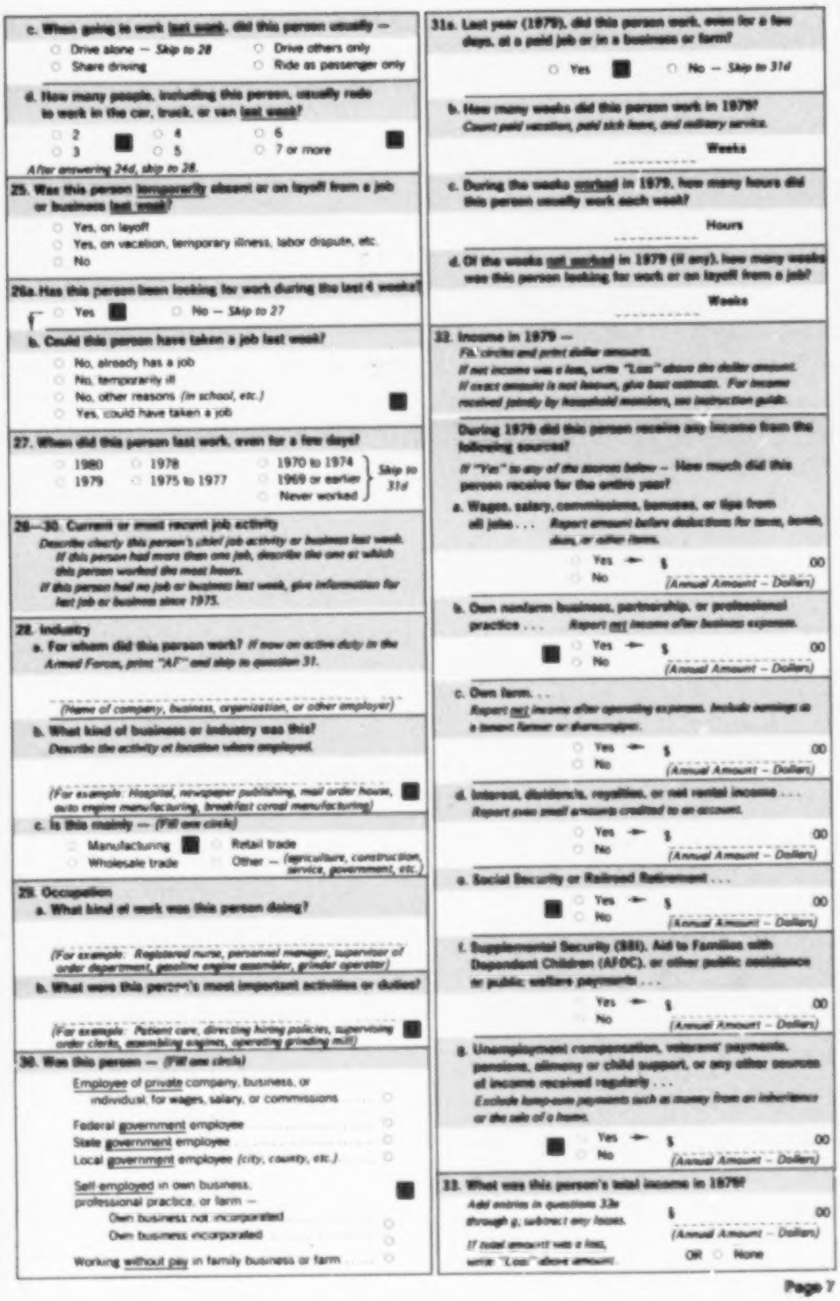
11. similar to a 1970 question, but the wording has been changed from "Where was this person born?"

12. similar to 1970, but the word "alien" has been changed to "not a citizen."

13. replaces one that asked about language other than English spoken in the home when the respondent was a child. The 1980 question should be more useful for determining how many Americans speak a language other than English and for determining how many persons do not speak English at all.

14. replaces two questions in 1970 on where the respondent's parents were born. The new approach is more subjective than the previous approach to ancestry.

Page 6



c. When going to work last week, did this person usually —

○ Drive alone — *Skip to 28*
○ Drive others only
○ Share driving
○ Ride as passenger only

d. How many people, including this person, usually rode to work in the car, truck, or van last week?

○ 2
○ 3
○ 4
○ 5
○ 6
○ 7 or more

After answering 24d, skip to 28.

25. Was this person temporarily absent or on layoff from a job or business last week?

○ Yes, on layoff
○ Yes, on vacation, temporary illness, labor dispute, etc.
○ No

26a. Has this person been looking for work during the last 4 weeks?

○ Yes
○ No — *Skip to 27*

b. Could this person have taken a job last week?

○ No, already has a job
○ No, temporarily ill
○ No, other reasons *(in school, etc.)*
○ Yes, could have taken a job

27. When did this person last work, even for a few days?

○ 1980
○ 1979
○ 1978
○ 1975 to 1977
○ 1970 to 1974
○ 1969 or earlier
○ Never worked
Skip to 31d

28–30. Current or most recent job activity

Describe clearly this person's chief job activity or business last week. If this person had more than one job, describe the one at which this person worked the most hours.
If this person had no job or business last week, give information for last job or business since 1975.

28. Industry

a. For whom did this person work? *If now on active duty in the Armed Forces, print "AF" and skip to question 31.*

(Name of company, business, organization, or other employer)

b. What kind of business or industry was this?
Describe the activity at location where employed.

(For example: Hospital, newspaper publishing, mail order house, auto engine manufacturing, breakfast cereal manufacturing)

c. Is this mainly — *(Fill one circle)*

○ Manufacturing
○ Wholesale trade
○ Retail trade
○ Other — *(agriculture, construction, service, government, etc.)*

29. Occupation

a. What kind of work was this person doing?

(For example: Registered nurse, personnel manager, supervisor of order department, gasoline engine assembler, grinder operator)

b. What were this person's most important activities or duties?

(For example: Patient care, directing hiring policies, supervising order clerks, assembling engines, operating grinding mill)

30. Was this person — *(Fill one circle)*

Employee of private company, business, or individual, for wages, salary, or commissions ○

Federal government employee ○
State government employee ○
Local government employee *(city, county, etc.)* ○

Self employed in own business, professional practice, or farm —
Own business not incorporated ○
Own business incorporated ○

Working without pay in family business or farm ○

31a. Last year (1979), did this person work, even for a few days, at a paid job or in a business or farm?

○ Yes
○ No — *Skip to 31d*

b. How many weeks did this person work in 1979?
Count paid vacation, paid sick leave, and military service.

Weeks

c. During the weeks worked in 1979, how many hours did this person usually work each week?

Hours

d. Of the weeks not worked in 1979 (if any), how many weeks was this person looking for work or on layoff from a job?

Weeks

32. Income in 1979 —

Fill circles and print dollar amounts.
If net income was a loss, write "Loss" above the dollar amount.
If exact amount is not known, give best estimate. For income received jointly by household members, see instruction guide.

During 1979 did this person receive any income from the following sources?

If "Yes" to any of the sources below — **How much did this person receive for the entire year?**

a. Wages, salary, commissions, bonuses, or tips from all jobs . . . *Report amount before deductions for taxes, bonds, dues, or other items.*

○ Yes → $ .00
○ No
(Annual Amount – Dollars)

b. Own nonfarm business, partnership, or professional practice . . . *Report net income after business expenses.*

○ Yes → $ .00
○ No
(Annual Amount – Dollars)

c. Own farm . . .
Report net income after operating expenses. Include earnings as a tenant farmer or sharecropper.

○ Yes → $ .00
○ No
(Annual Amount – Dollars)

d. Interest, dividends, royalties, or net rental income . . .
Report even small amounts credited to an account.

○ Yes → $ .00
○ No
(Annual Amount – Dollars)

e. Social Security or Railroad Retirement . . .

○ Yes → $ .00
○ No
(Annual Amount – Dollars)

f. Supplemental Security (SSI), Aid to Families with Dependent Children (AFDC), or other public assistance or public welfare payments . . .

○ Yes → $ .00
○ No
(Annual Amount – Dollars)

g. Unemployment compensation, veterans' payments, pensions, alimony or child support, or any other sources of income received regularly . . .
Exclude lump-sum payments such as money from an inheritance or the sale of a home.

○ Yes → $ .00
○ No
(Annual Amount – Dollars)

33. What was this person's total income in 1979?

Add entries in questions 32a through g; subtract any losses.
If total amount was a loss, write "Loss" above amount.

$ .00
(Annual Amount – Dollars)
OR ○ None

Page 7

15. same as in 1970.

16. same as in 1970.

17. same as in 1970.

18. same as in 1970.

19. resembles a question asked in 1970, but then it was asked only of persons less than 65 years old and was concerned only with a work disability. The 1980 question tested poorly, but so many public agencies need disability data that the question will appear anyway.

20. same as in 1970.

21. same as in 1970.

22. asked in 1970, but in 1980 respondents are also asked to write in the number of hours worked.

23. same as in 1970.

24a. a new question which attempts to measure average time spent getting to work.

24b. same as in 1970 but with the additional categories of truck, van, motorcycle, or bicycle.

24c & d. a new series of questions to measure the extent of carpooling.

25. same as in 1970.

26. same as in 1970.

27. same as in 1970.

28. resembles a question asked in 1970, but the words "… this person" have been substituted for the pronoun "he" in the questions on occupation, industry, and income.

29. same as in 1970.

30. same as in 1970.

31a & b. same as in 1970.

31c & d. new questions to measure part-time workers and the extent of unemployment in the previous year.

32. similar to 1970 except that the question has been recast as "income" instead of "earnings" and "interest, dividends …" and "unemployment compensation …" have been separated.

33. appeared in 1970 in slightly different form as part of the earnings question. This is the last question. The questions about population characteristics are repeated for up to seven persons in the household. If there are more than seven persons in a household an enumerator calls and tabulates responses of the additional persons.

Census Products and Services

Were the Census Bureau to print on paper all of the possible data tabulations from the 1980 Census, it would probably be the end of every tree on earth. Fortunately, only a tiny fraction of the data obtained from the census is available in paper form.

Nevertheless, the amount is enormous and has doubled with every recent census. In 1950, approximately 50,000 pages were printed, in 1960 there were 100,000 pages, and in 1970, 200,000 pages. Trying to slow this geometric growth, the Census Bureau plans to print only about 250,000 pages of reports for the 1980 Census.

The printed reports will be published in three major series—"preliminary," "advance," and "final." The preliminary reports, printed in the early fall of 1980, will show only the unofficial population and housing counts as compiled in the census field offices. Those reports will be superseded in the spring of 1981 by the advance reports containing official population and housing counts for all political subdivisions such as counties, towns, cities, and villages.

During 1981 and 1982, the final population and housing characteristics reports will be published. The less detailed reports will be available first, and the most detailed later in 1982. Preliminary and advance reports are sold by the Subscribers Services Section (Bureau of the Census, Washington, D.C. 20233), but the final reports are sold by the Superintendent of Documents (U.S. Government Printing Office, Washington, D.C. 20402). All publications and data files of the Census Bureau are listed in the agency's annual catalog, which has quarterly and monthly supplements. Order forms for any Bureau publications may be obtained without charge from the Subscribers Services Section. Appendix A (pages 34-35) gives titles of the various series and approximate dates when they will be available. Figure 3 illustrates how data are presented in printed reports and on computer tape.

Printed census publications can be found in the 117 libraries around the country designated as census depository libraries and sometimes in the more than 1,000 other government depository libraries. In addition, all Bureau reports are sent to each of the Census Bureau's 12 regional offices and the 43 Department of Commerce district offices. Appendix B (pages 36-38) gives addresses of these offices.

Statistics are also provided on computer tape and microfiche. Microfiche is such an efficient and permanent storage medium that all of the printed final reports will also be available from the Subscribers Services Section on microfiche. Even reports that are out of print can be obtained on microfiche. In addition, a substantial amount of the data on the computer tapes will be transferred directly from the magnetic tape to microfiche. As paper becomes increasingly expensive and difficult to obtain, the Census Bureau can be expected to provide more tabulations on microfiche alone.

Computer tape

Since 1970, more census data have been sold on computer tape than any other medium. After 1980, at least 90 percent of all census data tabulations purchased will be on computer tape. For those with access to a computer, which includes a growing number of users, this medium is the most inexpensive and efficient way to buy census data.

Most census computer tapes are called "summary" tapes because they contain only tabulations of data summarized for various geographical areas. Beginning in late 1980, summary tape data will be available for public use in five sets of tapes known as summary tape files (see Appendix A, page 35). Like the printed report series, the later

Figure 3. Census Printed Reports and Computer Tapes

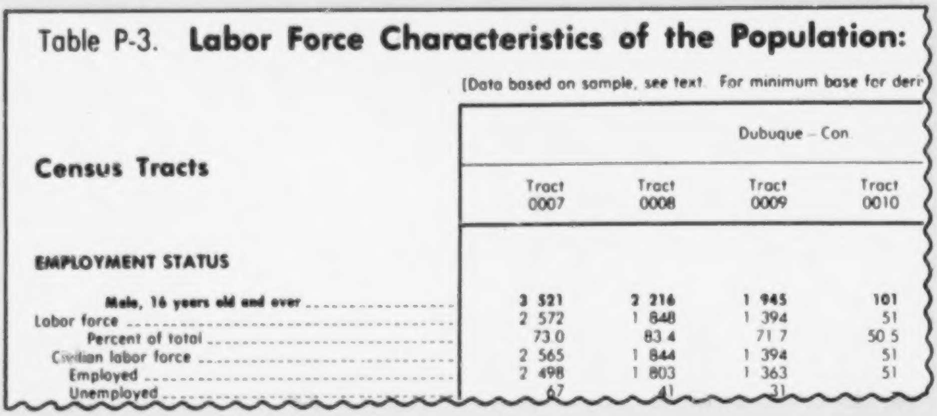
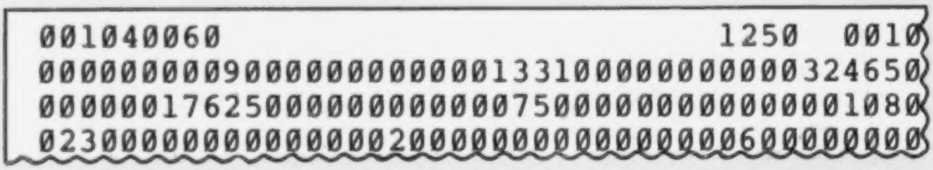


Table P-3. **Labor Force Characteristics of the Population:**

[Data based on sample, see text. For minimum base for deri

Census Tracts	Dubuque – Con			
	Tract 0007	Tract 0008	Tract 0009	Tract 0010
EMPLOYMENT STATUS				
Male, 16 years old and over	**3 521**	**2 216**	**1 945**	**101**
Labor force	2 572	1 848	1 394	51
Percent of total	73 0	83 4	71 7	50 5
Civilian labor force	2 565	1 844	1 394	51
Employed	2 498	1 803	1 363	51
Unemployed	67	41	31	

Sample of a census printed report. This shows how data are printed for each of the approximately 40,000 census tracts in the U.S.



```
001040060                         1250  0010
00000000090000000000000133100000000000324650
00000017625000000000007500000000000000001080
02300000000000000020000000000000000600000000
```

Census Summary Computer Tape Data. Computer programs convert this raw data into more readable formats.

tape files will contain progressively more detailed information for larger areas. The first two summary tape files will contain only data from the 100 percent questions, but these data will be tabulated for very small units of census geography.

The next three files will contain more detailed tabulations from the long form given only to a sample of the population. The most detailed demographic information will be on the fifth summary tape file, which will contain summaries for only states, very large cities, and metropolitan areas. This last summary tape file should be available by the end of 1982.

Technological advances have enabled the Census Bureau to provide on one reel of tape the same data that in 1970 would have required four reels. Since the price of a reel of computer tape has increased only slightly, the result is that the cost of acquiring a complete set of the publicly available census tapes has been reduced very substantially from what it was after 1970. This cost reduction will enable more researchers than ever before to access the information and certainly broaden the use of census statistics.

Even with the cost reduction, however, the use of computer tapes still requires a fairly high level of technical expertise and a reasonably sized computer. We are not yet at the point where census tapes can be used on small home computers.

Data User Services Division

Recognizing the need to provide technical assistance to the public, the Census Bureau has created the Data User Services Division. With a staff of more than 50 professionals, this division has five separate groups working directly on the 1980 Census products and services. Figure 4 shows the organization of the Data User Services Division. The dotted lines indicate sections with only some program administrative responsibility; staff members of State Data Centers and Summary Tape Processing Centers are not Census Bureau employees, and Regional Data User Services Officers are employees of the Census Bureau's field division.

The **Customer Services Branch** is responsible for selling computer tapes, census maps, and other census-related products. It is in effect the retail store for all census products except printed reports, which are sold by the Government Printing Office. The Customer Services Branch also provides the technical documentation and explanatory material necessary for using computer tapes.

The **User Training Branch** provides a wide variety of conferences and seminars designed to acquaint people with the census and also to train them in the use of census tapes and reports. Beginning in September, 1979, the Bureau will hold a series of more than 100 one-day conferences throughout the country to explain how to obtain and use the statistics from the 1980 Census. More detailed and longer training programs will be held at the Census Bureau's main office in Suitland, Maryland.

Many of these conferences or seminars will be held jointly with one of the Census Bureau's 12 regional offices. In each of these offices there is a full-time person to answer questions about census products (see Appendix B, page 36). The purpose of this regional staff is basically to make it more convenient for someone who needs census information.

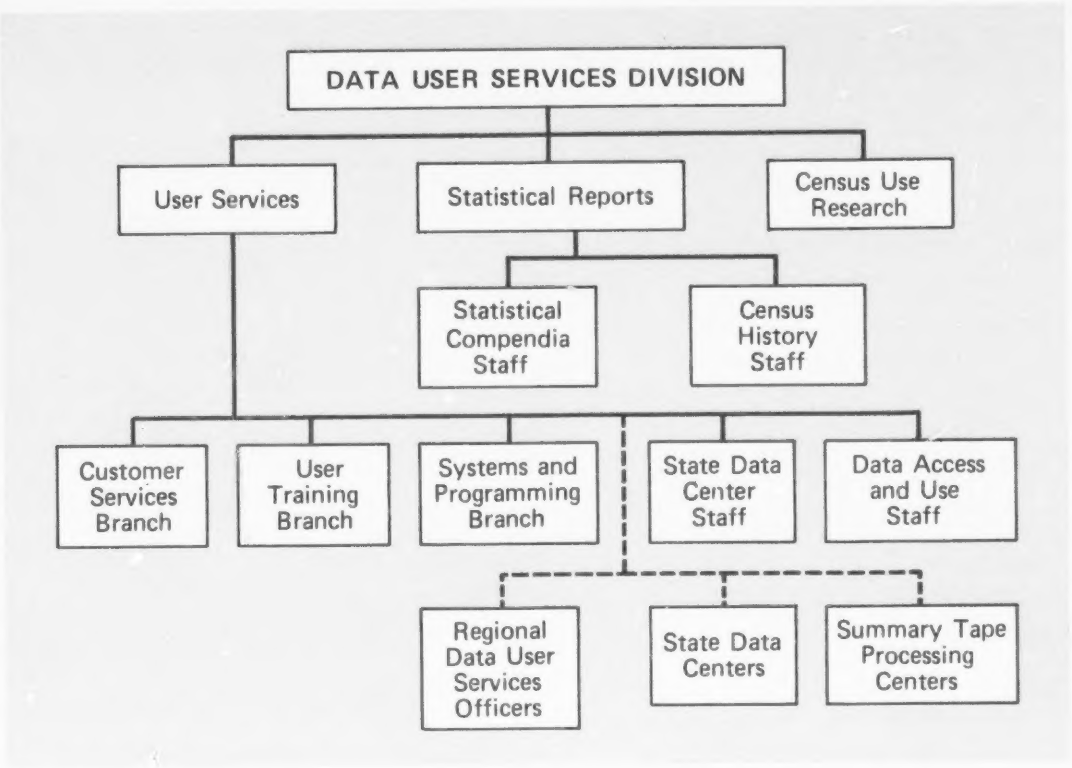
Another program with the same objective is the **State Data Center Program.** This program is a cooperative arrangement with a designated state agency to provide at least one place in each state where people who need census information can go. In addition to having complete census information for that state, each center is expected to provide technical assistance and some training programs. A network of substate affiliated data centers will be established by each of the State Data Centers to more directly assist local governments and people who need data on local areas. An up-to-date list of State Data Centers can be obtained free of charge from the Data User Services Division at the address given at the end of Appendix B (page 38).

The **Data Access and Use Staff** prepare the guides, indexes, and manuals that are useful for, and sometimes essential to, understanding census statistics. These guides, available from the Superintendent of Documents, provide lists of the data tabulations available on tape, microfiche and printed report indexes of the subject matter, and technical explanations of the publicily available computer tapes. Two general and widely distributed booklets are "The Census Users Guide" and the "Introduction to 1980 Census Products & Services."

The **Systems and Programming Branch** is developing publicly available computer programs to process the summary tapes from the census. These programs will perform a variety of tasks such as putting the data into a different format, selecting specific kinds of data, merging data from different tapes, or combining information for different geographic areas. The programs can be purchased early in 1980 so that buyers can try them out on computer tapes made for testing purposes from the Richmond Dress Rehearsal Census.

There are three other groups in the Data User Services Division, which, while not directly involved in 1980 Cen-

Figure 4. Data User Services Division: U.S. Bureau of the Census

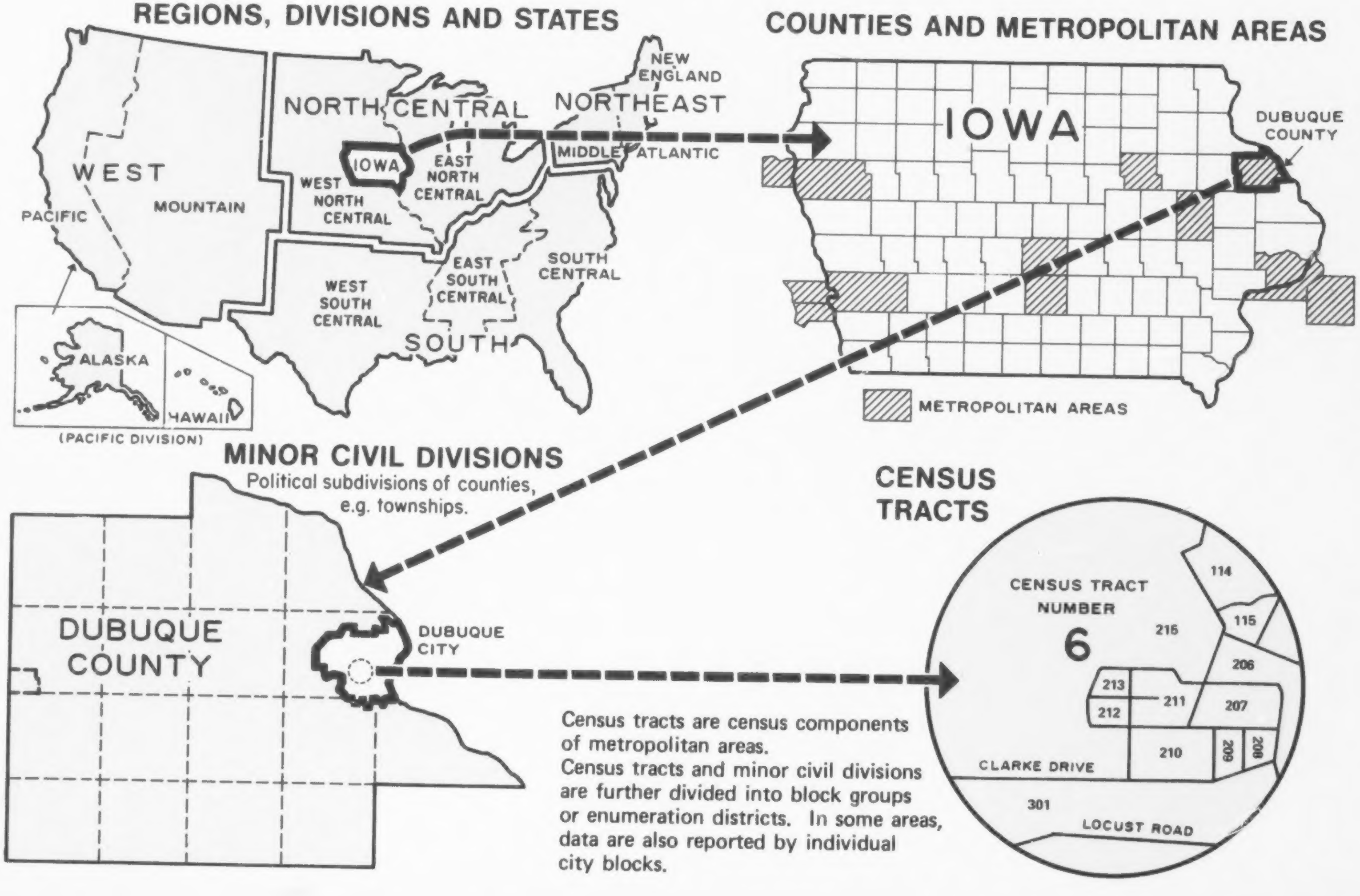

DATA USER SERVICES DIVISION
User Services
Statistical Reports
Census Use Research
Statistical Compendia Staff
Census History Staff
Customer Services Branch
User Training Branch
Systems and Programming Branch
State Data Center Staff
Data Access and Use Staff
Regional Data User Services Officers
State Data Centers
Summary Tape Processing Centers

sus products, perform important functions related to the census. The **Statistical Compendia Staff** annually prepare one of the country's most widely used reference works, the *Statistical Abstract of the United States*. They also compile the *County and City Data Book* as well as several other reference works. The **Census History Staff** prepare a detailed procedural history of each census as well as keeping historical records of other Census Bureau activities. **Census Use Research** conducts basic research into the ways in which census information is put to use, publishing the results.

One of the new programs started after the 1970 Census and continuing for 1980 is the **Summary Tape Processing Center Program.** This program is administered by the **State Data Center Staff** but does not involve Bureau personnel. It is a program for recognizing and listing organizations or individuals who have census computer tapes and are willing to process them for others. There are currently 86 processing centers listed, and more are expected when the 1980 computer tapes become available. An up-to-date list of these centers can also be obtained from the Data User Services Division (Appendix B, page 38).

While the Data User Services Division is set up to answer virtually any question about 1980 Census products, it is not their function to be experts in the data tabulations themselves. This is the role of people in the divisions directly involved with the content of the census—the Population, the Housing, and the Geography Divisions. Within each of these divisions, there are subject-matter specialists who can answer questions

Figure 5. Census Geography


REGIONS, DIVISIONS AND STATES
WEST
PACIFIC
MOUNTAIN
NORTH CENTRAL
WEST NORTH CENTRAL
IOWA
EAST NORTH CENTRAL
NORTHEAST
NEW ENGLAND
MIDDLE ATLANTIC
SOUTH
WEST SOUTH CENTRAL
EAST SOUTH CENTRAL
SOUTH CENTRAL
ALASKA
HAWAII
(PACIFIC DIVISION)
COUNTIES AND METROPOLITAN AREAS
IOWA
DUBUQUE COUNTY
METROPOLITAN AREAS
MINOR CIVIL DIVISIONS
Political subdivisions of counties, e.g. townships.
DUBUQUE COUNTY
DUBUQUE CITY
CENSUS TRACTS
CENSUS TRACT NUMBER
6
114
115
215
206
213
211
207
212
210
209
208
CLARKE DRIVE
301
LOCUST ROAD

Census tracts are census components of metropolitan areas.
Census tracts and minor civil divisions are further divided into block groups or enumeration districts. In some areas, data are also reported by individual city blocks.

about any aspect of the census content. For example, there are specialists in occupational data, income statistics, and migration in the Population Division, and experts in housing characteristics such as value, rent, vacancy, and building type in the Housing Division. The specialists in the Geography Division answer questions relating to such matters as computer mapping, census boundaries, and land area measurements.

A list of the publications of the Data User Services Division is shown in Appendix C (page 39). One of these publications, which is free, *Telephone Contacts for Data Users*, is a list of subject-matter specialists throughout the Bureau of the Census.

Census Geography

There was a simpler time, before computers were in general use, when "all" that the Geography Division of the Census Bureau had to do was prepare by hand the thousands of maps needed for the census. This work is still done by the Geography Division in Jeffersonville, Indiana, but at the same time the Bureau has made a substantial commitment to computer-assisted geographic processing.

The decision to take the 1970 and succeeding censuses primarily by mail required the Geography Division to develop a way to quickly identify addresses within units of census geography. The solution was to create a computerized address coding guide so that, given an individual address, the computer could search a list of address ranges with census geographic codes attached and locate the address with the proper census geography. This address coding guide has been improved and updated to the point where a majority of all 1980 Census questionnaires will be coded to the appropriate geographic area by computer.

The results of the census will be published for many thousands of different geographic areas. First, the data will be tabulated for the U.S. total, the 50 states, the District of Columbia, Puerto Rico, the outlying areas such as Guam, the four census regions, and the nine census divisions. Regions and divisions are groups of states (see Figure 5, upper left corner). There will also be data for 3,137 counties and 285 metropolitan areas (Figure 5, upper right corner).

Towns, townships, and other small political units within counties are called minor civil divisions. All counties are subdivided in some fashion and census data will be published for about 33,000 of these sub-county units (Figure 5, lower left corner). In addition, data will be tabulated for about 20,000 concentrations of population, some incorporated as villages or cities and some with no legal boundaries, all of which are called "places."

All metropolitan areas are subdivided by the Census Bureau into census tracts (Figure 5, lower right corner). These tracts, created for statistical purposes only, contain an average of about 4,000 persons and are designed to be relatively homogeneous in terms of population and housing characteristics. Census tracts and minor civil divisions are further subdivided into block groups or enumeration districts. An enumeration district is the area covered by one enumerator during the census period. It contains an average of about 800 persons, or 250 households. Since most of the census will be conducted by mail, the equivalent of the enumeration district in the mail census areas is the block group. Here enumerator work assignments are sets of addresses. The block group also contains about 800 persons and, as the name suggests, it is made up of a group of city blocks. There will be about 275,000 block groups and enumeration districts for the 1980 Census. The smallest unit of census geography for which data will be available is the city block. Containing an average of only about 60 people, there are two and a half million blocks. All places of 10,000 or more persons will have data for city blocks as well as some additional areas that have specially contracted with the Census Bureau.

Address coding

Every address for which there is a census questionnaire has to be coded with a block number, block group number, census tract number, and a code to identify its appropriate minor civil division, place, county, metropolitan area, and state. This is to make sure that when the questionnaire for 4222 Sheridan Street is tabulated, for example, it is counted as in the block bounded by Sheridan Street, Queens Chapel Road, Tuckerman Street, and Forty-third Avenue. Then this block must be credited to the incorporated place known as University Park and this in turn located in Prince Georges County in the state of Maryland. That address also needs to be counted in its proper block group and census tract. Pre-coding over 70 million addresses in this fashion before the questionnaires are mailed will require 2,000 hours of computer time. For the rest of the some 80 million questionnaires that are expected to be mailed, enumerators will enter this coding by hand when they call to collect the questionnaires, as noted earlier.

The address coding guide (containing ranges of addresses but no individual addresses), which was created by the Census Bureau in order to mail census forms, has been available to the public since the early 1970s. Since then, this innovation has caused a revolution in the processing of address-based information. Thousands of organizations both public and private have been able to process their customer or other address-based records more quickly and efficiently than ever before.

A bank, for example, can classify its customer list by census tracts using the address coding guide. By examining demographic data for these tracts, banks can locate their markets precisely and know where the best places are to put new branches or automated cash dispensing devices.

Municipal governments are also large users of address coding. The address of each theft or other criminal act recorded by the locality can be located by city block to quickly identify high crime areas and reassign police patrols. Also, by coding welfare records, caseworkers can be more efficiently assigned to neighborhoods. A large city carries on many public functions and the ability to use census geographic tools to match addresses from, say, building permit files with those of utility records, permits great flexibility and provides an opportunity to improve service without additional cost.

The address coding guides and address matching programs to be used in the 1980 Census will be available to the public in late 1979. The extension of the area covered by the address coding guides and other technical improvements will substantially increase the value of this innovation in geographical processing. However, in spite of this computerized revolution, the Census Bureau still continues to regard individual addresses as confidential and never sells or otherwise provides them to persons or organizations outside the Census Bureau.

The whole array of coding guides, matching programs, and other computerized geographical products is known as GBF/DIME, which stands for Geographic Base Files/Dual Independent Map Encoding. The intricacies of GBF/DIME are often the subject of training programs given by the Data User Services Division. Several updated booklets explaining the technical details will also be available in the coming months from the Subscribers Services Section.

Many of the computerized geographic products for the 1980 Census are prepared through a cooperative effort between the Census Bureau and local government organizations. Local agencies in some 236 of the country's 285 metropolitan areas have actively participated for several years in creating, updating, or expanding the geographic base files for their communities. Having local people carry out this work provides significant improvements in the data quality since they are the most knowledgeable about their area. Early local involvement also creates the best possible environment for local review of the census results, thereby improving the overall quality of the census data.

1985 and Beyond

If the census is so important, why is there only one every ten years? That question has been asked every decade since the days of Ulysses S. Grant. Reapportionment is the answer, in large part. Redefining Congressional district boundaries is such a monumental and politically disruptive task that few people want to do it more than once every ten years.

But in 1976 Congress passed legislation mandating a census every five years beginning in 1985, but specifically prohibiting the mid-decade census from being used for reapportioning seats in the House of Representatives. In fact, the law does not require that the census of 1985 be exactly like the 1980 Census. The law is quite flexible on the way the mid-decade census can be taken, so long as the basic objectives are met of providing the data on population and housing characteristics needed for fund allocation and program administration.

Considering the billion-dollar price tag for the 1980 Census, it is very unlikely that the 1985 Census will be a complete count in the sense of giving a questionnaire to every household. It probably will be a sample census larger than the 50,000 households surveyed each month for the Current Population Survey, but smaller than the approximately 18 million households given a sample questionnaire in 1980. There certainly will be a printed report, microfiche, and computer tape publications program for 1985 but it will be smaller than that for the decennial census. Data from the 1980 Census will be published for city blocks; the smallest unit of geography for the mid-decade census probably will be large cities.

The authorization for a mid-decade census serves to confirm the Census Bureau's growth from an obscure branch of the Commerce Department to the central part of an emerging federal statistical system. Collecting and processing federal information are sure to become more centralized and coordinated with the growing demand for data for decision-making and the development of micro-computing to make using data a management tool.

Recently retired census planner David L. Kaplan has written:

> "The census is no longer merely the source of interesting facts to put in the *Statistical Abstract* or an encyclopedia. It is now an action instrument which is critically involved in how the national pie—social, economic and political—is cut. This new role for the census, and of the Bureau of the Census, has changed the nature of the job and therefore the professional lives of those of us who work at it. Our shadowy existence in a world of passionate anonymity is gone.
>
> The press and the public are beating a path to Suitland [Census Bureau headquarters]; so are mayors and Indian tribal leaders, the poor and the handicapped, the academicians and the planners, as well as the purveyors of statistical information, both retailers and wholesalers."

In its new role, the census comes in for its share of criticism and public scrutiny. Those who use demographic data may believe not enough information is collected or that it is made available too slowly and without sufficient explanation. Others may feel the census is too intrusive, that it favors some interests but ignores others, or costs too much to administer.

These charges are not new, but they have taken on a new intensity as the value of the data produced by the Census Bureau rises. Every census is subject to attack because it is such a large-scale and public event, and the Census Bureau is ill-equipped for political combat. The figures it produces may be used to allocate tens of billions of dollars, but the Bureau's actual budget is never more than a small fraction of one percent of federal expenditures. It commands the allegiance of no single slice of American society and has no interest group which works in its behalf. Rather, as its slogan suggests, the Bureau sees itself as "fact finder for the nation"—more of a messenger bringing information than a central decisionmaker.

The undercount

With new visibility, issues arise that never seemed that important before. One of those issues is the undercount. When only 97.5 percent of the population is counted in a census, the estimated 2.5 percent missed is called an undercount. Since so much money is now tied to the population count, there has been considerable discussion about adjusting for this undercount so that some areas will not lose funds to which they would be entitled if the count were perfect.

The only reason we know that there is an undercount is because the Census Bureau makes such an estimate based on the previous census in conjunction with administrative statistics. Various methods have been suggested for adjusting for the undercount, but questions arise with any method. For example, since there is a differential undercount between blacks and whites, males and females, old and young, should there be differential adjustments for each of these groups? If so, what about other population sub-groups?

In the end, differential undercount adjustments could come to be expected for hundreds of population groups and for each of tens of thousands of geographical units. It would be a truly monumental task—with the possibility of as much error as that caused by the undercount in the first place.

Adjustment for an undercount is fundamentally a political decision. But it is important that the data, however adjusted, not become "politicized." One of the reasons census figures have become so important in public allocation formulas is that they are free from any political or programmatic bias.

Other agencies with a specific program to administer also gather statistics about their activities, but the natural tendency is for them to avoid gathering or publishing figures that might reflect badly on the agency's performance. Moreover, these agencies generally gather data from institutions, or users of services, whereas the Census Bureau counts everyone in a census, or in a survey queries individuals selected at random from a sample which covers the entire population. Federal spending programs develop loyalists and constituencies who generally do not like to admit that there may no longer be a need for their programs. The Bureau of the Census, on the other hand, exists by law to gather statistics only with regard to their timeliness, usefulness, and accuracy.

New pressures

The Census Bureau may be an innocent victim of the fragmentation of American society in the past decade. Those groups which David Kaplan describes as beating a path to the Census Bureau's door represent different interests, each with its own vision of society and its own needs.

In the past, it has been the role of political leadership to divide the national pie. The choices were simpler, because society was simpler. Now, in the words of Bryant Robey, editor of *American Demographics*, "National statistics may be replacing national consensus as the basis for public policy. If political leadership cannot summon the support of the American people as whole, the result is that it must mediate among the competing claims of different groups for a share of federal benefits."

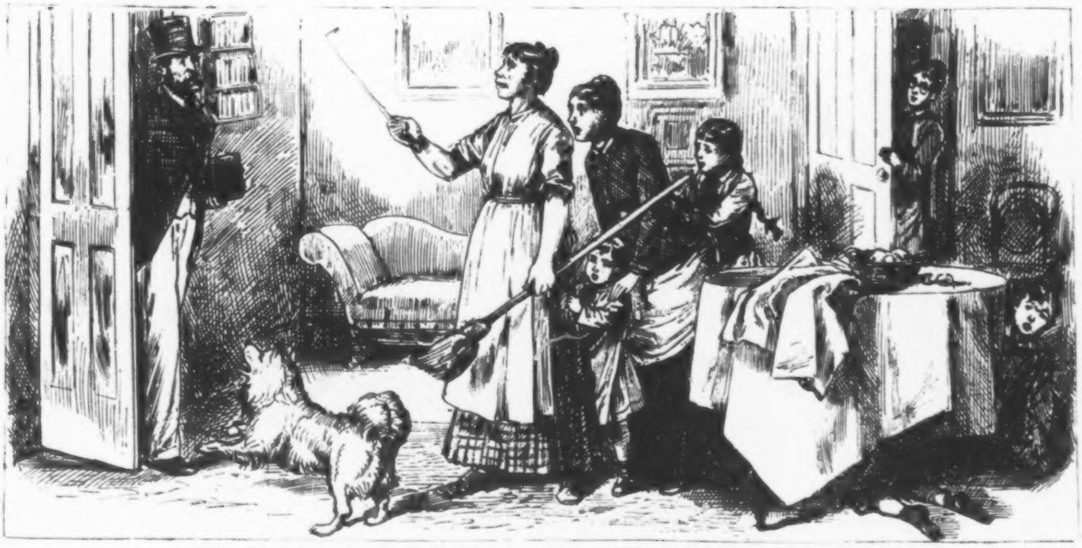
Census statistics may offer federal officials a rational basis for making allocation decisions, but "the focus of debate then shifts from those who make the decisions to those who gather the statistics. This trend is forcing the nation's chief statistical agency to change rapidly," Robey has written.

How the Census Bureau will survive these new pressures is as yet unclear. American society is not likely to return to simpler days, nor is the Census Bureau likely to return to its earlier days. Although the Bureau has faced scrutiny every ten years, the 1980 Census is a watershed because it is the first to be taken since passage of the revenue-sharing program, which for the first time allows for wholesale shifts in funds from federal to local levels without a programmatic base. It is also being taken at a time of growing attention to different ethnic groups, to the equality of women, to concern for the handicapped, and to public suspicion and scrutiny of the role of the federal government.

This is also a census that will measure some of the most dramatic demographic changes in our nation's history. Though many of the shifts are known already, the 1980 Census will be the first time these data have been gathered on a national scale in such depth.

This confluence of events—demographic, political, and statistical—will together make the 20th decennial census of 1980 the most dramatic, important, and closely observed in U.S. history since the first census of 1790. Its results may not make a best seller and they won't be made into a TV special to challenge the record audience of "Roots." But you will be using them and reading about them for years—until the next census. □

CENSUS
'80
APRIL 1



"Wonderful effect of the appearance of the census enumerator."

Early decennial censuses beginning in 1790 were ad hoc affairs conducted by U.S. Marshalls. Special census agents were hired for the first time in 1880, as illustrated in the above cartoon published in that year. In an essentially rural, lightly populated country, the census was far from the massive operation it has become.

Appendix A. Printed Reports and Computer Tapes for the 1980 Census

Population and Housing Census (PHC) Series

PHC(P)	*Preliminary Population and Housing Unit Counts.* Preliminary population and housing unit counts. Summer-Fall 1980.*
PHC(V)	*Final Population and Housing Unit Counts.* Advance official population and housing unit counts. Fall 1980-Winter 1981.
PHC(1)	*Block Statistics.* 100-percent population and housing data for blocks in blocked areas. Winter-Summer 1981.
PHC(2)	*Census Tracts* 100-percent and sample data. Fall 1981-Summer 1982.
PHC(3)	*Summary Characteristics for Governmental Units.* 100-percent and sample data. Fall 1981-Spring 1982.

Population Census (PC) Series

PC(1)-A	*Number of Inhabitants.* Population counts. Fall 1980-Spring 1981.
PC(1)-B	*General Population Characteristics.* 100-percent data. Winter-Summer 1981.
PC(1)-C	*General Social and Economic Characteristics.* Sample data. Fall 1981-Spring 1982.
PC(1)-D	*Detailed Population Characteristics.* Sample data. Fall 1981-Spring 1982.
PC(2)	*Subject Reports.* Tentative release: 1982.

Housing Census (HC) Series

HC(1)-A	*General Housing Characteristics.* Counts of housing units and 100-percent housing data. Winter-Summer 1981.
HC(1)-B	*Detailed Housing Characteristics.* Sample data. Fall 1981-Spring 1982.
HC(2)	*Metropolitan Housing Characteristics.* Sample data. Fall 1981-Fall 1982.
HC(3)	*Subject Reports.* 1982.
HC(4)	*Components of Inventory Change.* 1982.
HC(5)	*Residential Finance.* 1982.

Public-Use Computer Summary Tape Files (STFs)

STF 1	Population and housing counts and limited 100-percent characteristics down to the block level. Fall 1980-Summer 1981.
STF 2	General 100-percent characteristics down to the tract level and for places of 1,000 or more population. Winter-Summer 1981.
STF 3	Sample tabulations for ZIP Code areas, enumeration districts, and block groups. Fall 1981-Spring 1982.
STF 4	General sample tabulations down to the tract level. Fall 1981-Spring 1982.
STF 5	Detailed sample tabulations for states, SMSAs (metropolitan areas), large cities, and counties. Spring-Fall 1982

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*Tentative availability dates are provided as ranges of dates since data for some states will be tabulated and released before other states, depending on the progress of field and coding operations.

Appendix B. Regional Data User Services Officers and U.S. Department of Commerce District Offices

Regional Data User Services Officers

ATLANTA
Wayne Wall
Bureau of the Census
1365 Peachtree Street, N.E., Room 625
Atlanta, Georgia 30309
(404) 881-2274

BOSTON
Judith Cohen
Bureau of the Census
441 Stuart St., 10th Floor
Boston, Massachusetts 02116
(617) 223-0668

CHARLOTTE
Lawrence McNutt
Bureau of the Census
Suite 800, 230 South Tryon Street
Charlotte, North Carolina 28202
(704) 371-6144

CHICAGO
Steve Laue
Bureau of the Census
55 E. Jackson Blvd., Suite 1304
Chicago, Illinois 60604
(312) 353-0980

DALLAS
Valerie McFarland
Bureau of the Census
1100 Commerce Street, Room 3C54
Dallas, Texas 75242
(214) 749-2394

DENVER
Gerald O'Donnell
Bureau of the Census
575 Union Blvd., P.O. Box 25207
Denver, Colorado 80225
(303) 234-5825

DETROIT
Timothy Jones
Bureau of the Census
Federal Bldg. & U.S. Courthouse, Rm. 565
231 W. Lafayette Street
Detroit, Michigan 48226

KANSAS CITY
Kenneth Wright
Bureau of the Census
One Gateway Center
4th and State Streets
Kansas City, Kansas 66101
(816) 374-4601

LOS ANGELES
E. J. (Bud) Steinfeld
Bureau of the Census
11777 San Vicente Blvd., 8th Floor
Los Angeles, California 90049

NEW YORK
Jeffery Hall
Bureau of the Census
Federal Office Bldg., Room 37-130
26 Federal Plaza
New York, New York 10007
(212) 264-3870

PHILADELPHIA
David Lewis
Bureau of the Census
William J. Green, Jr. Federal Bldg.
600 Arch Street, Room 9244
Philadelphia, Pennsylvania 19106
(215) 597-8314

SEATTLE
Larry Hartke
Bureau of the Census
915 Second Avenue, Room 312
Seattle, Washington
(206) 442-7080

U.S. Department of Commerce District Offices

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Suite 1015, 505 Marquette Ave., N.W.
Albuquerque, New Mexico 87102

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Anchorage, Alaska 99501

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Suite 600, 1365 Peachtree St., N.E.
Atlanta, Georgia 30309

BALTIMORE
Room 415, U.S. Customhouse
Baltimore, Maryland 21202

BIRMINGHAM
Suite 200, 908 South 20th St.
Birmingham, Alabama 35205

BOSTON
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Boston, Massachusetts 02116

BUFFALO
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Buffalo, New York 14202

CHARLESTON
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Charleston, West Virginia 25301

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Cheyenne, Wyoming 82001

CHICAGO
55 East Monroe St.
Chicago, Illinois 60603

CINCINNATI
550 Main St.
Cincinnati, Ohio 45202

CLEVELAND
666 Euclid Ave.
Cleveland, Ohio 44114

COLUMBIA
2611 Forest Dr.
Columbia, South Carolina 29204

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1100 Commerce St.
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Room 165, New Customhouse
Denver, Colorado 80202

DES MOINES
210 Walnut St.
Des Moines, Iowa 50309

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Room 445, Federal Bldg.
Detroit, Michigan 48226

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Room 203, Federal Bldg.
Greensboro, North Carolina 27402

HARTFORD
450 Main St.
Hartford, Connecticut 06103

HONOLULU
300 Ala Moana Blvd.
Honolulu, Hawaii 96850

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Indianapolis, Indiana 46204

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Milwaukee, Wisconsin 53202

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Reno, Nevada 89509

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Richmond, Virginia 23240

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125-29 Bull St.
Savannah, Georgia 31402

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1700 Westlake Ave., North
Seattle, Washington 98109

Other sources of 1980 Census information (see text, pages 26 and 27):

The list of **State Data Centers** and **Summary Tape Processing Centers** changes frequently. An up-to-date list can be obtained without charge from:

Martha Wyeth
Data User Services Division
Bureau of the Census
Washington, D.C. 20233
(301) 763-2400

Appendix C. Census Reference Works

The following publications are available from:

Subscribers Services Section (Publications)
Bureau of the Census
Washington, D.C. 20233
(301) 763-7472

The 1980 Census—Introduction to Products and Services, October 1979.

The 1980 Census Users Guide, October 1979.

Index to 1980 Census Tapes and Publications.

The Subscribers Services Section can also supply publication order forms, free of charge, which include prices and availability for the above three reference works, all the census reports listed in this Appendix, and most other census-related government publications.

Telephone Contacts for Data Users, 4 pages, updated periodically, free.

1980 Census Update, quarterly supplement to the *Data User News*, free.

Data User News, monthly newsletter, $4.00 per year, single copies 25 cents each.

Factfinder for the Nation, issued irregularly, each issue 4 pages, topics include population, housing, and geography, 25 cents each.

Data Access Description No. 37: Current Survey Statistics Available from the Bureau of the Census, May 1977, $1.30. Other *Data Access Descriptions* will be available that describe various aspects of the 1980 Census.

Reference Manual on Population and Housing Statistics from the Census Bureau, April 1977, $2.00.

The following publications are available from:

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402
(202) 783-3238

Bureau of the Census Catalog, GPO No. C3.163/2, annual with monthly and quarterly supplements, $19.00 per year.

Statistical Services of the United States Government 1976, GPO No. 041-001-00100-0, 234 pages, $3.40.

Federal Statistical Directory 1976, GPO No. 041-001-00125-5, 248 pages, $2.50.

The Methods and Materials of Demography, GPO No. 003-001-02289-3, 2 volumes, $15.75 per set.

Statistical Abstract of the United States 1978, GPO No. 003-024-01647-8, 1,057 pages, $8.00.

County and City Data Book 1977, GPO No. 003-024-00121-7, 1,011 pages, $19.50.

The following publications are available from the sources noted:

American Demographics magazine, published monthly except combined July/August and November/December issues, by American Demographics, Inc., P.O. Box 68, Ithaca, N.Y. 14850. April 1979 was a special issue on the census and there is a monthly column which discusses various aspects of the 1980 Census. $30.00 per year, single copies $4.00 each.

Counting the People in 1980: An Appraisal of Census Plans, by the National Research Council, Office of Publications, National Academy of Sciences, 2101 Constitution Avenue N.W., Washington, D.C., 20418, $7.25.

Information and Allocation: Two Uses of the 1980 Census, by Nathan Keyfitz, May 1979 issue of *The American Statistician*, published by The American Statistical Association, 806-15th Street N.W., Washington, D.C., 20005. $10.00 per year, single copy prices on request.

Recent Population Bulletins and PRB Slide Series

Beginning October 1, 1979, the prices for all *Population Bulletins* are $2.00 per single copy; 2-49 copies, $1.75 each; 50 copies or more, $1.50 each. Sets of 35mm colored slides for the figures and tables appearing in the *Bulletin* are available as indicated.

Volume 31

No. 1 *Infant Mortality—Progress and Problems*, by Leon F. Bouvier and Jean van der Tak

No. 2 *Adolescent Pregnancy and Childbearing—Growing Concerns for Americans*, by Wendy H. Baldwin, May 1977 updated reprint (13 slides, $6.50)

No. 3 *Rural Renaissance in America? The Revival of Population Growth in Remote Areas*, by Peter M. Morrison, with Judith P. Wheeler (6 slides, $3.00)

No. 4 *Can Third World Cities Cope?* by George J. Beier (5 slides, $2.50)

No. 5 *Communicating Population and Family Planning*, by Robert P. Worrall (3 slides, $1.50)

No. 6 *Fertility Regulation Technology: Status and Prospects*, by Sheldon J. Segal and Olivia Schieffelin Nordberg (2 slides, $1.00)

Volume 32

No. 1 *The Value and Cost of Children*, by Thomas J. Espenshade (27 slides, $13.50)

No. 2 *Epidemiologic Transition in the U.S.: The Health Factor in Population Change*, by Abdel R. Omran. Sold out.

No. 3 *Changing Contraceptive Patterns: A Global Perspective*, by Dorothy Nortman (13 slides, $6.50)

No. 4 *International Migration: Yesterday, Today, and Tomorrow*, by Leon F. Bouvier, with Henry S. Shryock and Harry W. Henderson, August 1979 updated reprint (13 slides, $6.50)

No. 5 *Marrying, Divorcing, and Living Together in the U.S. Today*, by Paul C. Glick and Arthur J. Norton, February 1979 updated reprint (27 slides, $13.50)

No. 6 *Indonesia's Family Planning Story: Success and Challenge*, by Terence H. Hull, Valerie J. Hull, and Masri Singarimbun (20 slides, $10.00)

Volume 33

No. 1 *Boys or Girls? Parents' Preferences and Sex Control*, by Nancy E. Williamson (5 slides, including frontispiece photo, $2.50)

No. 2 *Canada's Population: Growth and Dualism*, by Roderic P. Beaujot (14 slides, $7.00)

No. 3 *What Will a ZPG Society be Like?* by Lincoln H. Day (8 slides, $4.00)

No. 4 *Declining World Fertility: Trends, Causes, Implications*, by Amy Ong Tsui and Donald J. Bogue (15 slides, $7.50; excludes two Appendix tables)

No. 5 *Mexico's Population Policy Turnaround*, by John S. Nagel (10 slides, $5.00)

No. 6 *World of Children*, by Magda Cordell McHale and John McHale, with Guy F. Streatfeild (5 slides, $2.50)

Volume 34

No. 1 *The Sunning of America: Migration to the Sunbelt*, by Jeanne C. Biggar (9 slides, $4.50)

No. 2 *Frustrated Fertility: A Population Paradox*, by Joseph A. McFalls, Jr. (3 slides, $1.50)

No. 3 *Resources, Environment, and Population: The Nature of Future Limits*, by Ronald G. Ridker and Elizabeth W. Cecelski (12 slides, $6.00)

No. 4 *The 1980 Census: The Counting of America*, by Peter K. Francese (7 slides, including 3 for Figure 2, $3.50).

Send orders with checks to:

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Population Bulletin

Our Population Predicament: A New Look

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Abstract—Issued to mark the Population Reference Bureau's 50th anniversary, this *Bulletin* updates the story of world population presented in its popular predecessor of 1971, "Man's Population Predicament." Estimated at half a billion in 1650, world population reached 2 billion in 1930, 4 billion in 1975, and is projected to be about 6 billion in 2000. Most of today's rapid growth is occurring among the three-quarters of the world's peoples living in less developed countries where the post-World War II gap between high birth rates and falling death rates has only recently begun to narrow. This growth, coupled with high consumption in developed countries, is putting tremendous pressures on Earth's resources, environment, and social fabric. New evidence on Europe's demographic transition and from China, Indonesia, and Thailand in the 1970s suggests that well-designed family planning programs can speed fertility decline but rapid worldwide attainment of replacement-level fertility—an average family of about two children—will also require special development efforts and "beyond family planning" measures. Current projections for the world's ultimate peak population range from 8 billion in the mid-21st century to 11 billion about 2125, depending on when replacement-level fertility is reached. China's drive for a drastic birth rate reduction and the oil crisis might change fertility behavior more rapidly than most demographers have heretofore thought likely.

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Graphics: James O'Brien

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Our Population Predicament: A New Look

By Jean van der Tak, Carl Haub, and Elaine Murphy

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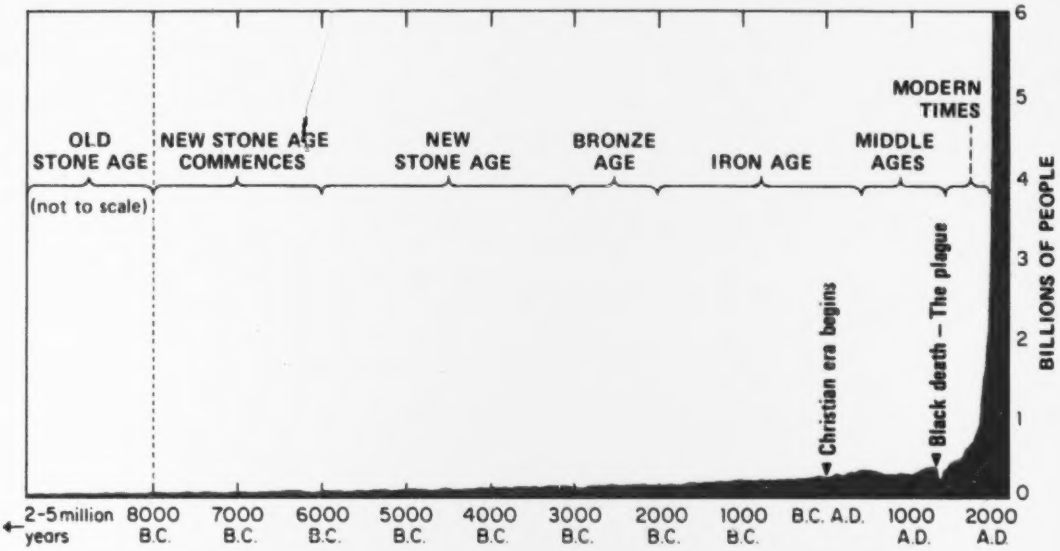
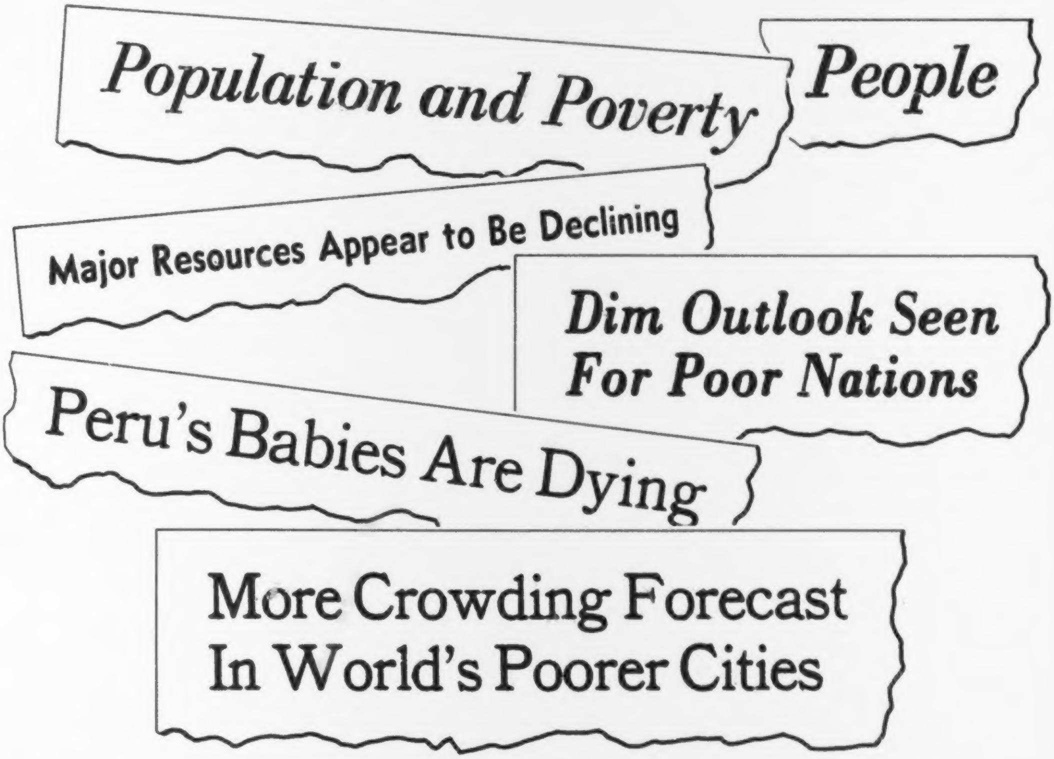
Figure 1. World Population Growth Through History





Population and Poverty

People

Major Resources Appear to Be Declining

Dim Outlook Seen For Poor Nations

Peru's Babies Are Dying

More Crowding Forecast In World's Poorer Cities

Human numbers took two to five million years to reach their first billion, about 1800 A.D. By 1975, 175 years later, the figure was up to four billion. Adding the next two billion could take only 25 years, according to current projections. Today's population explosion is putting tremendous pressures on Earth's resources, environment, and social fabric.

Our Population Predicament: A New Look

By **Jean van der Tak,**
Carl Haub, and **Elaine Murphy**

Population Reference Bureau, Inc.

About this Bulletin

Published in April 1971, "Man's Population Predicament," by the Population Reference Bureau's then President and Editor, Rufus E. Miles, Jr., was one of the most widely quoted and distributed of the Bureau's 40-year series of Population Bulletins. *In graphic words and charts, Mr. Miles described the origins and implications of the post-World War II global population explosion. Among the first to see that explosion looming was Guy Irving Burch when he founded the PRB in 1929. Hailed as a "demographic Paul Revere," warning that* people are coming!, *Burch appears to have coined the very term "population explosion" in his November 1950* Population Bulletin, *"A Winning Program for Democracy," later condensed in* Reader's Digest. *Burch was cited with the Lasker Award after his untimely death in January 1951: "Perhaps more than any other individual he was responsible for today's awareness of the population problem and the need for positive action to resolve it."*

This "new look" at our population predicament is issued as a tribute to Guy Irving Burch; to PRB's 50 years of "telling the world about population"; and in recognition that awareness of the population problem, though growing, is needed more than ever as the 1980s dawn, along with much more positive and immediate action to resolve it.

To conclude this update, Rufus Miles has provided a thoughtful look at what he sees as the intensified "Age of Discontinuity" which the world is now entering as China aims for a drastic reduction in its birth rate and the era of cheap petroleum comes to an end.

Jean van der Tak is PRB's Director of Publications, Carl Haub is Staff Demographer, and Elaine Murphy is Director of Population Education. Jean van der Tak and Carl Haub are graduates of the Master's Degree Program in Demography of the Center for Population Research, Georgetown University. Dr. Murphy holds the Ph.D. in Human Development from the University of Maryland.

The authors are grateful for the helpful comments and suggestions received in the preparation of this Bulletin *from Leon Bouvier, Marshall Green, Rufus Miles, Conrad Taeuber, and their colleagues on the PRB staff. Parts of the* Bulletin *draw upon the excellent review of the current world population situation by Ambassador Marshall Green, former U.S. Department of State Coordinator of Population Affairs, and Robert Fearey, "World Population: The Silent Explosion,"* Department of State Bulletin *(Department of State Publication 8956, October 1978).*

The human population of the earth probably passed the 4.3 billion point in 1979, increasing by some 74 million each year. We say "probably" because population data are still scanty and unreliable for parts of Asia and Africa although demographers are becoming adept at making plausible estimates from deficient data. At its current 1.7 percent rate of increase, every three years the world population grows by nearly as many people as the 220 million living in the U.S. in 1979. Every five days we add another million people to our human population.[1]

This population explosion seems all the more awesome when seen in the perspective of humanity's development as a species. During the hundreds of thousands of years of the Old Stone Age when *homo sapiens* was a hunter and food gatherer, the world population

Table 1. Estimated Timing of Each Billion of World Population

	Time taken to reach	Year attained
First billion	2-5 million years	About 1800 A.D.
Second billion	Approx. 130 years	1930
Third billion	30 years	1960
Fourth billion	15 years	1975
Projections:		
Fifth billion	12 years	1987
Sixth billion	11 years	1998

Sources: United Nations, *The Population Debate: Dimensions and Perspectives. Papers of the World Population Conference, Bucharest, 1974*, Vol. 1, Population Studies No. 57 (1975) Table 1, *Demographic Yearbook 1962* and *1969*, and *World Population Trends and Prospects by Country, 1950-2000: Summary Report of the 1978 Assessment*, ST/ESA/SER.R/33(1979); and, John D. Durand, "Historical Estimates of World Population," *Population and Development Review*, Vol. 3, No. 3 (September 1977) pp. 253-296.

probably never exceeded 10 million. Somewhere about 8,000-6,000 B.C., humans learned how to grow food and create settlements and eventually cities. The shift from food gathering to food growing was a momentous change: far larger numbers could be supported. By the time of Christ, 1 A.D., world population had grown to about 300 million and by 1650 A.D. reached an estimated 500 million.

The increase from about 10 million at the beginning of the agricultural era to 500 million some 8,000-10,000 years later—a fifty-fold increase—was a "population explosion" in itself. This term, however, applies with greater accuracy to the far more rapid gain that has occurred in the past three and a quarter centuries and particularly in the 35 years since World War II (see Figure 1). The world reached its first billion around 1800—some two to five million years after the appearance of the first humanlike creatures.[2] Adding the second billion took about 130 years to 1930. The third billion was reached after only 30 years, in 1960, and the fourth after 15 years, in 1975 (Table 1). About 1965, the world's rate of population growth climbed to 2 percent—a rate at which numbers double in 35 years. That growth rate has now fallen slightly and is expected to continue to decline, although at an unknown pace. Even so, world population is projected to be about 6 billion by the year 2000, when the numbers being added each year could be well over 90 million. (The box on the opposite page explains some of the arithmetic involved in this growth.) The level at which mankind's total numbers will ultimately peak now appears to lie between 8 and 11 billion, depending on the determination with which the world addresses the problem.

Global population growth occurs as a result of the excess of births over deaths. Most of today's growth is taking place among the some three-quarters of the world's population living in the less developed regions—Latin America, Africa, and Asia (minus Japan). Here, previously high death rates fell rapidly after World War II and by about 1977 were at the comparatively low level of 12 deaths per 1,000 population per year. Birth rates, though beginning to fall—rapidly, in some cases—are still at an average 33 per 1,000 population annually. As a result, the developing regions are growing at a rapid 2.1 percent each year. By contrast, among the other quarter of the globe's population in de-

Demographic Arithmetic

Growth rates

Most growth rates referred to in this *Bulletin* are the *rate of natural increase*—annual births minus deaths per 1,000 population, expressed as a percentage. For example:

About 1977, the world had a birth rate of 28 per 1,000 population, a death rate of 11 per 1,000, and therefore, by subtracting 11 from 28, a natural increase rate of 17 per 1,000, or 1.7 percent.

For a country or region, as opposed to the world, a true *population growth rate* adds in the effect of net immigration or emigration. For example:

In 1978, the U.S. had a natural increase rate of 0.6 percent and a population growth rate of 0.8 percent, taking into account net legal immigration. (Illegal immigration adds more to the U.S. population growth rate, but the exact amount is unknown.)

Doubling time

One way to grasp the implications of a particular rate of population growth is to consider how long it would take a population growing at that rate to double. A 1 percent growth rate means a doubling in 69 years; a 2 percent rate results in a doubling in 35 years; and a 3 percent rate doubles a population in 23 years. A quick way to calculate a doubling time is to divide 69 by the percentage of growth. For example:

If the world's 1.7 percent population growth rate of 1979 were to remain constant, the current population of 4.3 billion would double to 8.6 billion in 41 years (69 ÷ 1.7 = 40.6).

Annual growth rate (%):	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Years to double population:	69	46	35	28	23	20	17

Growth rate versus numbers added

Even though a population's growth *rate* may decline, the *actual numbers of people added* each year may increase, because the base population is becoming larger and larger. For example:

In 1979, the world's population growth rate of about 1.7 percent applies to a global population of 4.3 billion for a gain of 73.5 million people each year (.017 x 4.321 billion = 73.5 million). About 2000, the United Nations projects that the world's population growth rate will be down slightly to 1.5 percent but the total population will be about 6.2 billion so that the numbers added each year will be up to 93 million (.015 x 6.199 billion = 93.0 million). See figure below.

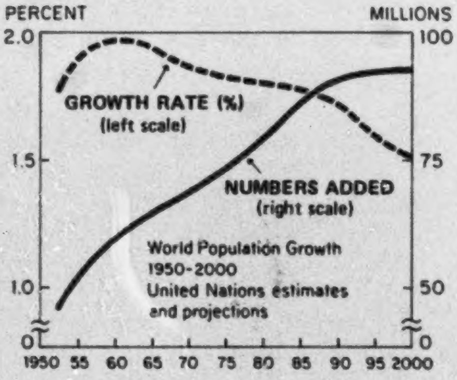


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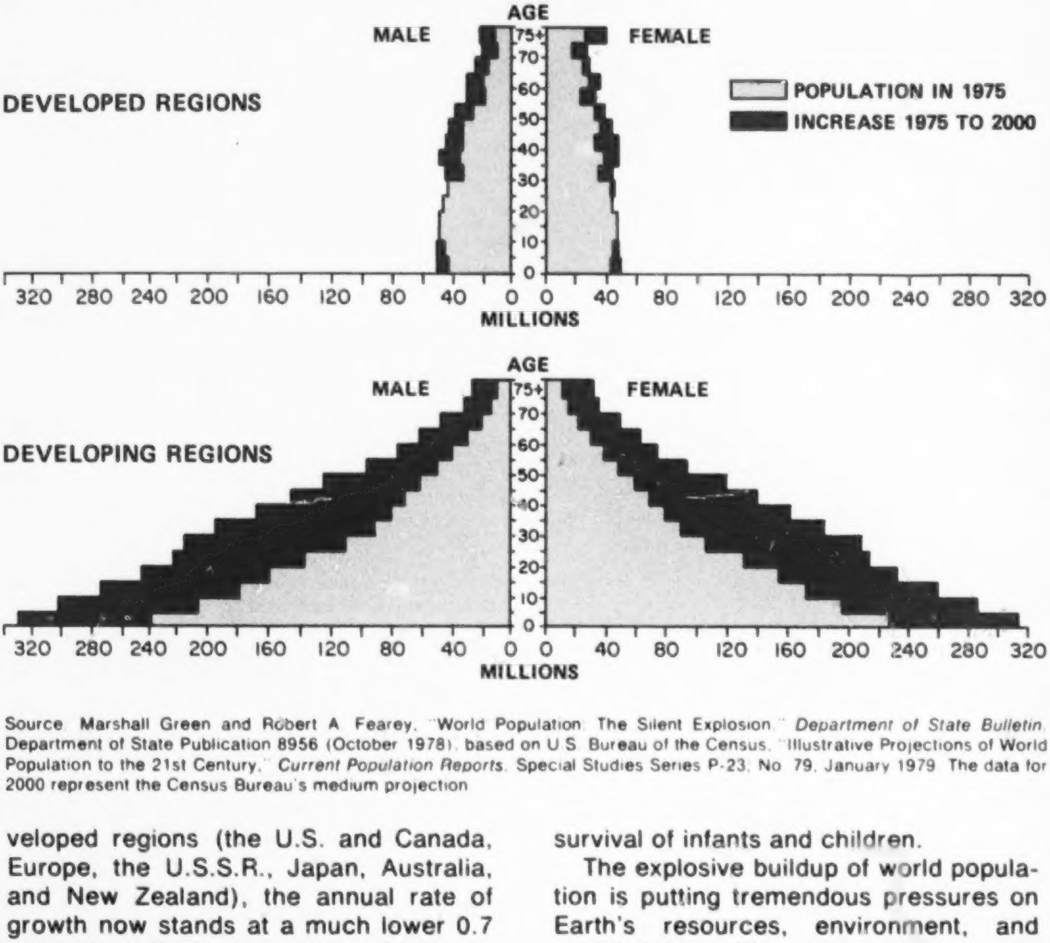
Figure 2. Population Age Pyramids: Developed and Developing Regions, 1975 and 2000



Source: Marshall Green and Robert A. Fearey, "World Population: The Silent Explosion," *Department of State Bulletin*, Department of State Publication 8956 (October 1978), based on U.S. Bureau of the Census, "Illustrative Projections of World Population to the 21st Century," *Current Population Reports*, Special Studies Series P-23, No. 79, January 1979. The data for 2000 represent the Census Bureau's medium projection

veloped regions (the U.S. and Canada, Europe, the U.S.S.R., Japan, Australia, and New Zealand), the annual rate of growth now stands at a much lower 0.7 percent—reflecting an average birth rate of 16 per 1,000 and a death rate of 9 (1977 estimates). Figure 2 brings out strikingly the differences in current population size between the developed and the developing regions and the impact of their differential growth rates. Between 1975 and 2000, the population of developed regions is expected to grow slowly while that of the developing regions expands enormously. Much of the developing regions' growth will be due to their much larger proportions of young people now in or about to enter their childbearing years—the result of continuing high fertility and greatly improved survival of infants and children.

The explosive buildup of world population is putting tremendous pressures on Earth's resources, environment, and social fabric. The pressures are currently felt most acutely in developing regions where hundreds of millions already live in abject poverty and hunger. But the pressures are compounded by the developed countries' high per capita consumption of resources and output of pollution. The population predicament is shared by all humanity.

This *Bulletin* sketches the development of the predicament in modern times, Europe's "demographic transition" from high to low birth and death rates, the implications of that great shift for today's high-fertility, developing nations, and the beginnings of their transi-

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tion. Sections follow on the consequences of rapid population growth and the worldwide response to the problem so far. The conclusion discusses prospects for the future and the approaches now being proposed to hasten attainment of global zero population growth before human numbers overshoot Earth's sustaining capacity.

The Explosion Takes Off

What has fueled the takeoff of world population growth in modern times? Population growth in global terms can come about in only one way—when births exceed deaths. This simple relationship is expressed in the "balancing equation" all students of population learn:

Population =
(at a later date)
Population + (births - deaths)
(at the earlier date)

It is evident from Figure 1 (page 2) that, beginning about 1650, the excess of births over deaths worldwide must have become larger and larger.

The relationship in the equation, although quite basic, represents a more complex series of causes. Fluctuations in fertility, the number of births a woman *actually has*, obviously affect growth; fecundity, the number of births a woman is *able* to have, varies among populations; and mortality, the rate at which people leave a population through death, has different causes at different times in different areas. Improved fecundity brought about by better nutrition and disease control has played something of a role in modern population growth—in Western Europe during the 18th and early 19th centuries, for example, and in Sub-Saharan Africa today. Increased fertility played a role in the galloping growth of the U.S. and Canada during the 19th century: with the availability of seemingly boundless land, the millions of migrants who crossed the Atlantic were encouraged to produce larger families than their parents and grandparents often dared in land-short Europe.[3] But it is falling mortality that has been chiefly responsible for the sudden spurt in world population growth since about 1800.

Lower mortality means not only more population growth because people are being subtracted more slowly by death but also more births because more young people survive to and through their years of fertility. The devastating effect of high mortality on potentially fertile young people in past times is illustrated by the following:

> "Abraham Lincoln's mother died when she was thirty-five and he was nine. Prior to her death she had three children: Abraham's brother died in infancy and his sister died in her early twenties. Abraham's first love, Anne Rutledge, died at age nineteen. Of the four sons born to Abraham and Mary Todd Lincoln, only one survived to maturity. Clearly, a life with so many bereavements was very different from most of our lives today."[4]

The mortality revolution

Humanity's first real control over pestilence (infectious disease) and famine—the scourges which, along with war, had kept death rates close to high birth rates throughout human history—took hold in Western Europe as the Industrial Revolution gathered steam in the late 18th century and early 19th century and spread to North America by the mid-19th century. This mortality revolution was triggered by social and economic changes that accompanied new agricultural technologies and increasing industrialization and urbanization. Improved agricultural techniques boosted food supplies which lessened the danger of famine and improved nutrition. With better nutrition came increased resistance to infection and tolerance of severe illnesses. Living conditions gradually improved as industrialization raised personal incomes. This brought better housing, which reduced diseases associated with crowding, such as tuberculosis, and improved personal hygiene. Soap use went up and people switched from lice-hiding wool to cotton underwear.

Later in the 19th century and on into the early 20th century, public health and medical advances hastened the mortality decline. The need to separate water supplies from sewage was established; pasteurization of milk and smallpox inoculation were introduced; and medicine gradually reached the point where more people were cured by treatment than were killed by pre-antiseptic conditions. The causative factors of a host of ancient killers, including plague, yellow fever, cholera, typhus, dysentery, diphtheria, tuberculosis, and malaria were identified, and the means of controlling them developed.[5]

Death rates began to drop. In the 1840s in several Western European countries, data indicate that only about 85 percent of those born survived the first year of life and about 65 percent lived to age 15. A century later, close to 96 percent survived the first year and about 75 percent lived to age 60. The death rate in the now developed countries dropped from an estimated 28 per 1,000 population in 1850 to 15 in 1950 and 9 in 1977 (Figure 3).

Much of this decline in mortality reflected the greater survival of infants. In Sweden, for example, at the beginning of the 19th century, about 200 of every 1,000 children born failed to survive their first year. This infant mortality rate dropped gradually to 100 deaths per 1,000 live births about 1900 and then more rapidly to 21 by 1950 and about 8 by 1977. Although Sweden's infant mortality rate is now the lowest in the world, other Western countries have had a similar decline.[6]

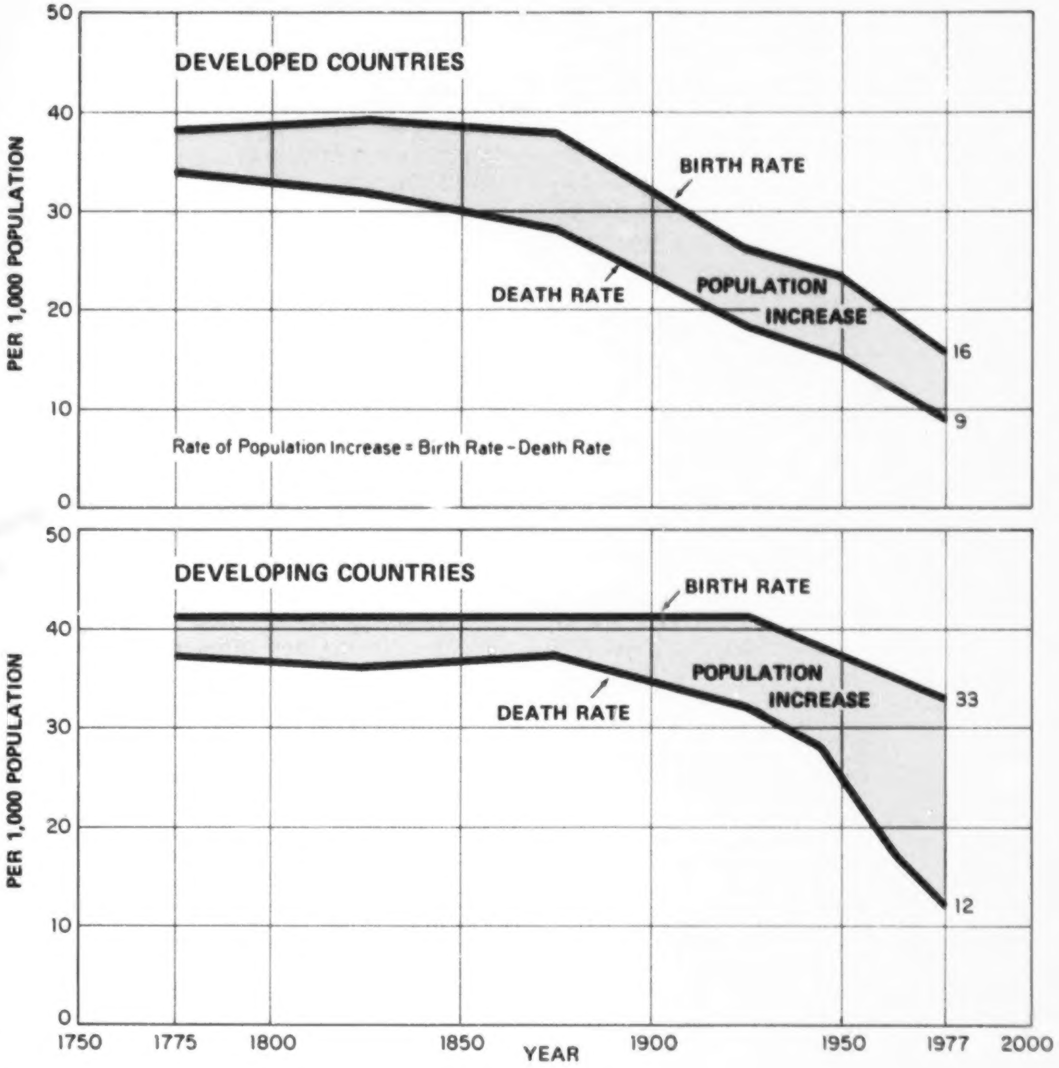
There were setbacks to the now developed world's mortality revolution. In Europe, the Irish potato famine of 1846 took 800,000 lives and the two world wars of the 20th century claimed millions more. But with the near elimination of most serious infectious diseases, the main causes of mortality shifted to the chronic and stress diseases, such as cancer and heart disease, which strike more among older people.

Late in the 19th century, birth rates also started to come down in the more developed countries in tandem with the gradually falling death rates, easing population growth before it could mount to a burdensome level. For Europe, population pressures were also eased by massive migration to the relatively empty lands of the New World—chiefly the U.S. and Canada, Argentina and Brazil, South Africa, and Australia and New Zealand. Between 1820 and 1930, an estimated 55 million Europeans—a quarter of Europe's population—left to seek their fortunes overseas.[7]

The story was different in the less developed world. Until the end of World War II, there was a gradual decline in mortality, probably due to improving water supplies and other public sanitary measures. But estimates indicate that death rates were still close to 30 per 1,000 in the late 1940s.

Following World War II, however, the decline in mortality became much steeper. In Sri Lanka (then Ceylon), for instance, the death rate came down from 20 to 14 in a single year and, in consequence, the estimated life expectancy at birth went up from 43 years in 1946 to 52 years in 1947. In general, in less developed countries, the death rate dropped from an estimated 28 per 1,000 population in the 1940-50 decade to 17 per 1,000 in the 1960-70 decade. The pace of decline has since slowed but, even so, the estimated rate for less developed countries as a whole was down to 12 per 1,000 by 1977 (Figure 3). There are wide regional variations, however. Latin America's death rate of just 8 per 1,000 population is lower than that of most developed countries (including the U.S. at 9 per 1,000), due largely to much higher proportions of young people. Asia's death rate is 11,

Figure 3. Birth and Death Rates: Developed and Developing Countries, 1775 to 1977



Source: Population Reference Bureau, based on United Nations estimates

while Africa's death rate of 17 is the highest of any region.[8]

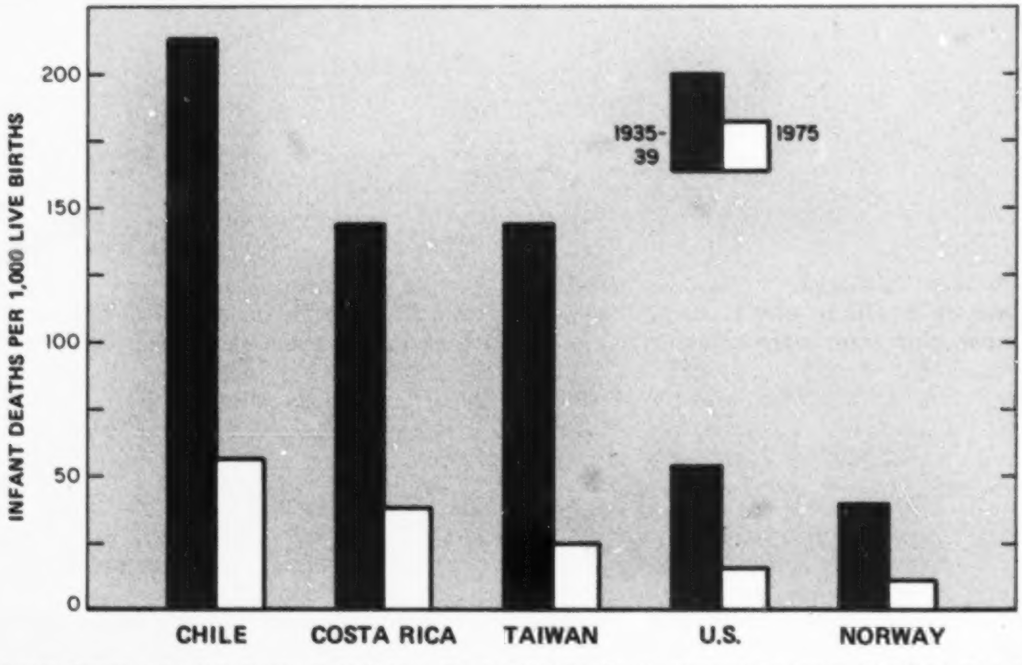
The developing world's mortality revolution was triggered not by social and economic development as in the West, but by medical and public health technology—antibiotics, sanitation, immunization, insecticides (DDT to strike at malaria-bearing mosquitoes, for example), and campaigns against such major killers as smallpox. Much of this technology was imported and applied overnight through international health and foreign aid programs, and food aid cut famine tolls in times of drought. The result was a telescoping into two decades of the mortality decline that had taken a century in the developed world. Birth rates have scarcely had time to adjust and population growth rates have soared.

The reduction in infant mortality has particular significance in terms of the population equation since the survival of children means they will probably become parents themselves. Although deaths among infants in many less developed countries, particularly in Africa, are still five to seven times what they are in industrialized nations, the decline since the 1930s has been dramatic in many cases. For example, as seen in Figure 4, between 1935-39 and 1975, annual infant deaths per 1,000 live births fell from 213 to 56 in Chile and 144 to 25 in Taiwan. In the U.S. in the same period, the decline was from 53 to 16.

Europe's Demographic Transition

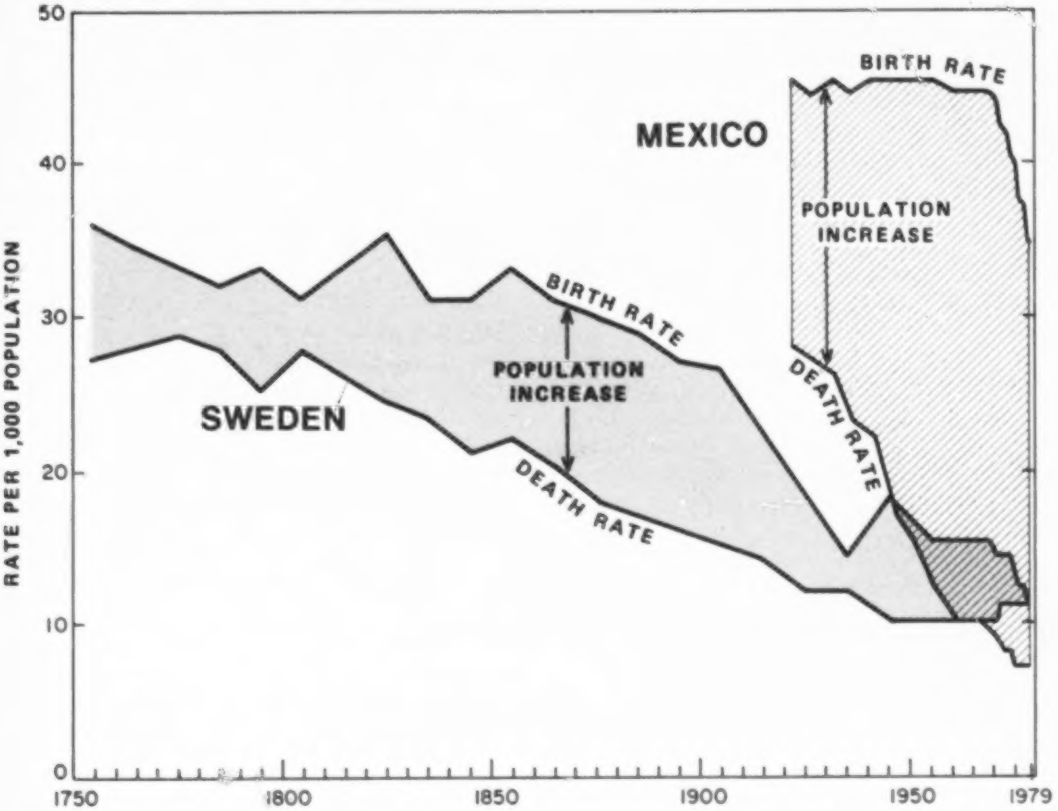
The historical pattern of Sweden's birth and death rates shown in Figure 5 is typical of Western European countries. Until the late 18th century, both rates fluctuated at a relatively high level. Then as the Industrial Revolution accelerated in the early 19th century, the death rate began to fall gradually, followed some 50 to 70 years later by the birth rate. By the 1930s, both were at low levels. Today, following a brief post-World War II rise in the birth rate, Sweden's annual births and deaths are in balance and the population has stopped growing from natural increase. This pattern applies generally to the now developed

Figure 4. Infant Mortality Decline: Selected Countries, 1935-39 to 1975



Sources: Taiwan, 1975: U.S. Bureau of the Census, *Republic of China*, Country Demographic Profile, ISP-DP-12, 1978. All other data: United Nations, *Demographic Yearbook 1966* and *1977*.

Figure 5. Birth and Death Rates: Sweden, 1755-1978, and Mexico, 1920-1979



Sources:
Sweden: 1775-1970, Gosta Guteland et al., *The Biography of a People: Past and Future Population Changes in Sweden* (Stockholm: Royal Ministry for Foreign Affairs, 1974); 1971-78, United Nations, *Demographic Yearbook 1977* and *Monthly Bulletin of Statistics*, September 1979.
Mexico: 1920-72, John S. Nagel, "Mexico's Population Policy Turnaround," *Population Bulletin*, Vol. 33, No. 5 (December 1978) Figure 2; 1973-79, U.S. Bureau of the Census, *Mexico*, Country Demographic Profile, ISP-DP-14, 1979.

countries, although there are exceptions. In the U.S. and Canada, for example, birth rates were higher in the late 18th century and throughout most of the 19th century than they were in Europe, and the post-World War II rise in birth rates was prolonged to the early 1960s. However, now, in the late 1970s, as in most developed countries, the gap between their birth and death rates is narrow: in 1978, in the U.S., the birth rate was 15 per 1,000 population and the death rate was 9, and in Canada, the rates were 15 and 7.

Since the 1930s, demographers have sought to explain how and why this evolution from high to low birth and death rates came about in today's developed countries. The best known explanation, based mainly on what was thought to be the experience in Western Europe, is known as the demographic transition theory. In its "classic" form, this theory describes three stages:

- The *initial stage of potentially high population growth* evolves from a backdrop of high death rates reflecting harsh living conditions and high birth rates needed to compensate for high infant mortality. With improved living conditions and control over disease brought about by "modernization," death rates begin to fall. At first, birth rates remain high, causing a rise in population growth.

- During the subsequent *transitional stage*, the rate of population growth is still relatively high, but a decline in birth rates becomes well established. The small-family ideal arises first among "upwardly mobile" couples, particularly in cities, who come to see too many children as a hindrance to taking advantage of the opportunities offered by the expanding industrial economy. The preference for few children gradually diffuses throughout the country, aided by declining rates of infant mortality.
- The *stage of very low or zero population growth* is reached when mortality is low and fertility hovers around replacement level. Fertility could stabilize below replacement level, leading, in the absence of net immigration, to an eventual decline in the absolute size of a country's population. (Replacement level fertility is explained in the next section.)

Relevance for less developed countries

This view of Europe's historical record and the "theory" based on it have shaped much of the recent thinking about the gap between birth and death rates in today's less developed countries (LDCs), such as Mexico (Figure 5). Particularly emphasized are the notions of fertility decline as a more or less automatic reaction to mortality decline and socioeconomic development as the stimulant for both declines. These ideas have been used to argue that organized family planning programs cannot do much to precipitate or accelerate fertility decline in the developing world. Birth rates will begin a general decline, it is held, only when socioeconomic development has reached such a "threshold" of literacy, infant survival, industrialization, and urbanization that the majority of individual couples perceive small families to be to their own advantage. Modern contraceptives are not necessary for this fertility decline to take place, it is alleged, since much of Europe's fertility decline occurred long before the advent of pills, intrauterine devices (IUDs), and sterilization. This argument was summed up in the rallying cry of many Third World government delegations to the 1974 World Population Conference in Bucharest: "Development is the best contraceptive."

Over the long run, the decline in European birth rates did indeed take place against a general background of modernization and falling mortality. However, a recent spate of studies based on new analytical methods and much more detailed evidence now reveals that there were many deviations from the pattern described in the classical demographic transition theory. Thus it is possible that the shift to low fertility in today's LDCs might also occur differently.*

These studies confirm that in England, for example, birth rates did start falling only after considerable urbanization and industrialization had occurred, late in the 19th century. But they also reveal that the decline began about the same time in far less developed Hungary. And the first evidence of fertility decline was in France, a century earlier, when that country's people were overwhelmingly rural, poor, and illiterate, and infant mortality was still very high. This suggests that a well-designed family planning program could reduce birth rates in a preindustrial society before the speculated "threshold" of development is achieved. Even if some socioeconomic development may be necessary to touch off a fertility decline, there is no telling precisely what factors—or com-

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*This new analysis of historical evidence and its implications for population policies in today's LDCs have been summarized by demographers John Knodel and Etienne van de Walle in a recent *Population and Development Review* article[9] and for PRB's next *Population Bulletin*.

bination of factors—make up such a threshold and, conversely, no assurance that development alone will trigger a fertility decline.

The evidence of widespread infant and child abuse turned up by this recent research suggests that large families were not necessarily desired in pretransition Europe—a reason often given for the persistence of high fertility in some LDCs today. Neglect, abuse, and resulting high rates of infant and child mortality may have been one way of adjusting to high fertility rather than vice versa. Similarly in some LDCs today, high infant mortality may in part reflect couples' reactions to unwanted births (and recent research in Latin America points in this direction[10]). It could be that alternative methods of birth control are simply unknown, inaccessible, or considered objectionable.

This was apparently true in pretransition Europe. Of the two available methods other than abortion, it now appears that withdrawal was less well known than has been assumed and associated mainly with extramarital sex. And long-term abstinence required a high degree of self control. Both were also male methods while it was the women who bore the brunt of incessant childbearing and probably wanted fewer children. Wives in developing countries may also be more interested in birth prevention than their husbands, the historical researchers suggest, and thus current family planning programs which "stress female methods, such as the pill, IUD, injections, and tubal ligation, should contribute to an acceleration of fertility decline."[11] In other words, it may not be necessary to wait for infant mortality to fall in a given LDC before women can be expected to accept modern contraception.

That family limitation took hold in Europe and areas of Western culture overseas like English-speaking Canada mainly in just 30 years from 1880 to 1910, despite widely different circumstances, suggests another lesson from the past. Once some couples lead the way, the idea and practice of family planning can diffuse rapidly. Family planning programs which provide both effective means of fertility control and information about them can speed up this innovation-diffusion process. The historical reproductive revolution also seemed to follow cultural and linguistic lines, independently of socioeconomic development. In Europe, ethnic pockets of high fertility, as in Flemish-speaking Belgium, remained long after considerable development had taken place and after fertility had fallen elsewhere. This is true today in the Muslim Central Asian republics of the U.S.S.R. and other societies where women are extremely subordinated and isolated. In such societies, it is suggested, "policies designed to alter the status of women may be more conducive to reduced fertility than either family planning alone or more general development efforts."[12]

Peace Corps photo

The large numbers of children in less developed countries hold the potential for vast world population increases in the future (page 14).

In sum, the history of Europe's fertility decline as reexamined does appear relevant for today's developing nations, although the "classical theory" of demographic transition may now have to be revised. The new studies do not deny that socioeconomic development enhances couples' motivation for smaller families. But they also suggest that "in many cases a greater payoff [in hastening birth rate decline] might well result from concentrating efforts on improving and extending existing family planning programs."[13]

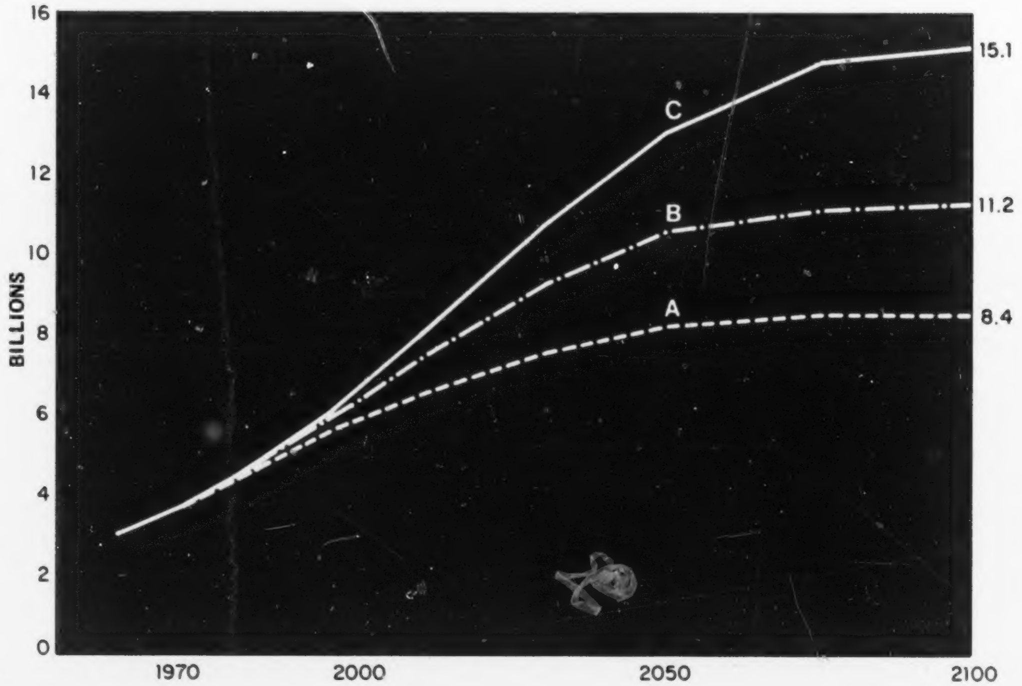
Birth rate reductions in present-day developing countries have often been closely associated with economic and social progress before organized family planning got underway (Singapore, Taiwan, Costa Rica, Hong Kong, and South Korea, for example). However, significant declines have also occurred in relatively backward socioeconomic settings but where political, bureaucratic, and community resources—and womanpower—have been fully mobilized behind family planning (China and Indonesia). On the other hand, Mexico's birth rate remained well above 40 per 1,000 until the mid-1970s, despite rapid economic growth and urbanization and a heavy emphasis on education. A national population program was launched in 1973 and the birth rate has since declined markedly (Figure 5).

In two important respects, the demographic transition in today's developing world is and will be very different from that of Europe. In developing countries, birth rates were often in the high 40s per 1,000 population about 1950-55 at the beginning of their demographic transition and still are that high in Africa today, due in part to early and universal marriage. By contrast, the average in Western Europe in the late 18th century was 30-35 per 1,000. Also, the mortality decline which took a century or more in Western Europe occurred precipitously in most LDCs in about 15 years from the late 1940s to the early 1960s. The result has been population growth rates two or three times what they ever were in Western Europe. Mexico's rate of natural increase reached an explosive 3.5 percent in 1964-66, for example, whereas Sweden's never exceeded 1.2 percent.[14]

The Momentum Factor

The runaway population growth of developing countries in the past three decades is not only adding huge numbers now but also holds the potential for vast population increases in the future and a long delay before annual births come down to annual deaths and the world reaches zero population growth. With high fertility coupled with dramatic declines in mortality, some 40 to 50 percent of developing countries' populations are now composed of children under age 15 in contrast to only 25 percent in developed regions. (Compare the broad-based 1975 population age pyramid of the developing regions in Figure 2, page 6, with the narrow base of that of the developed regions.) Because of this, population would continue to grow for a long time even if it were possible to attain, in the next few decades, an average level of fertility worldwide that would merely replace the parent generation—2.1 to 2.5 children per woman, depending on mortality conditions. The numbers of young people coming into the ages of fertility in developing countries are so much larger than the numbers of people at older ages that, even if couples were to average only enough children to replace themselves, total births would continue to outstrip total deaths until the disproportion in the number of people in the childbearing ages disappears. This could take a century or more in countries where population growth has been very high. The size of the eventual zero growth population would be far larger than at the time fertility dropped to replacement level.

Figure 6. Momentum of World Population Growth



IF THE WORLD ATTAINED REPLACEMENT FERTILITY IN[a]	WORLD POPULATION WOULD THEN STAND AT	AND WORLD POPULATION COULD BE EXPECTED EVENTUALLY TO STABILIZE AT
(A) 2000 – 05	5.9 BILLION (2000)	8.4 BILLION
(B) 2020 – 25	8.4 BILLION (2020)	11.2 BILLION
(C) 2040 – 45	12.0 BILLION (2040)	15.1 BILLION

Source: Tomas Frejka, *The Future of Population Growth: Alternative Paths to Equilibrium*, A Population Council Book (New York: Wiley-Interscience, 1973).

[a] The fertility decline is assumed to begin in all cases with the 1965-70 level. Thus, replacement-level fertility (2.1-2.5 births per woman) by 2000-05, for example, implies a gradual reduction of fertility over a 35-year period.

Figure 6 illustrates the implications for the world of this almost irresistible momentum of growth built into the current youthful age structure of the three-quarters of the world's population living in developing countries. If fertility worldwide were to decline to replacement level by 2000 and stay there—a very optimistic assumption—global population would stop growing only some 60 years later at 8.4 billion, nearly double its 1979 size. If replacement-level fertility is delayed to 2040-45, the ultimate steady-state population would be 15.1 billion, three and a half times that of 1979. (Population Council demographer Tomas Frejka used 1965-70 as the base period in calculating these projections. He expects new calculations, now in preparation, will somewhat reduce the ultimate population totals shown here.)

Table 2 (next page) shows what popu-

Table 2. Projected Timing of Replacement-Level Fertility and Ultimate Population Size: Selected Developing Countries

(Population in millions)

Country	Mid-1977 population	Assumed year when replacement level fertility is reached	Hypothetical size of ultimate stationary population	Year when stationary population is reached
India	632	2020	1,643	2150
Brazil	116	2015	341	2075
Indonesia	134	2020	357	2145
Bangladesh	81	2035	334	2165
Nigeria	79	2040	435	2135
Mexico	63	2015	204	2075
Thailand	44	2005	105	2095
Egypt	38	2010	90	2105

Source: World Bank, *World Development Report 1979* (New York: Oxford University Press, 1979) Table 17.

lation momentum means for eight large developing countries, as recently calculated by the World Bank. Mexico, for example, could reach replacement-level fertility by 2015 if its recent family planning program progress continues, according to the World Bank—down from about 6 children per woman in 1975. If this level held, Mexico's population would take another 60 years to stop growing and would then be more than three times its 1977 size. India, currently the world's second most populous country after China, would take more than a century to reach a stabilized population of 1.6 billion after achieving replacement-level fertility about 2020, according to these calculations. For the world as a whole, the World Bank currently projects replacement-level fertility also about 2020 and an ultimate stationary (non-growing) population of about 9.8 billion, achieved about 70 years later.

Several developed countries now have below-replacement-level fertility, that is, fewer than two births per woman among those now bearing children. If this were to become widespread, growth would stop sooner and the world's population would stabilize at a smaller size. A sustained fertility level below replacement would eventually lead to a decline in the absolute size of a population. China is about to become the first country to adopt such a policy. A new law is being formulated to promote the one-child family with the eventual aim of achieving negative population growth and a reduction in total population size. If successful, this could greatly accelerate the cessation of global population growth at a smaller number than most demographers have hitherto thought possible since China accounts for over a fifth of the world's population.

LDC Birth and Death Rates in Transition

Although reliable data to verify trends are lacking for many less developed countries, most demographers are now convinced that fertility has begun to decline in developing countries as a whole, and in some LDCs the decline is much more rapid than it was in Europe. At the same time, the precipitous decline in LDC death rates that marked the 1950s and early 1960s appears to have slowed.

Parker Mauldin and the late Bernard Berelson, former Population Council researchers, estimated that in the decade from 1965 to 1975 the birth rate of 94 LDCs with 98 percent of the developing world's population declined on average about 13 percent, from about 41 to 35.5 births per 1,000 population.[15] In 28 developing countries containing over two-thirds of the world's population, the decline ranged from 10 to 40 percent. The decline was most marked in Asia and Latin America. Sub-Saharan Africa showed virtually no fertility decline and, with death rates continuing to fall, population growth in Africa had climbed to 2.9 percent about 1977, the highest of any region.

Demographers Amy Ong Tsui and Donald Bogue of the University of Chicago analyzed the record for 1968-75 in a recent *Population Bulletin* and came to essentially the same conclusion as Mauldin and Berelson: the fertility transition has now begun for much of the developing world, most rapidly in such populous Asian countries as China, Indonesia, South Korea, the Philippines, and Thailand.[16] They estimate that the world's total fertility rate or average rate of childbearing fell from 4.6 births per woman in 1968 to 4.1 births in 1975.

In Asia, increasingly delayed marriage appears to have accounted for much of this decline. However, in general, the major cause to date has been reduced fertility among married women, particularly those over age 30. This relates in varying degrees to a fairly steady growth in the proportion of women of childbearing age who use modern contraceptive methods, accelerated in many LDCs by organized family planning programs.

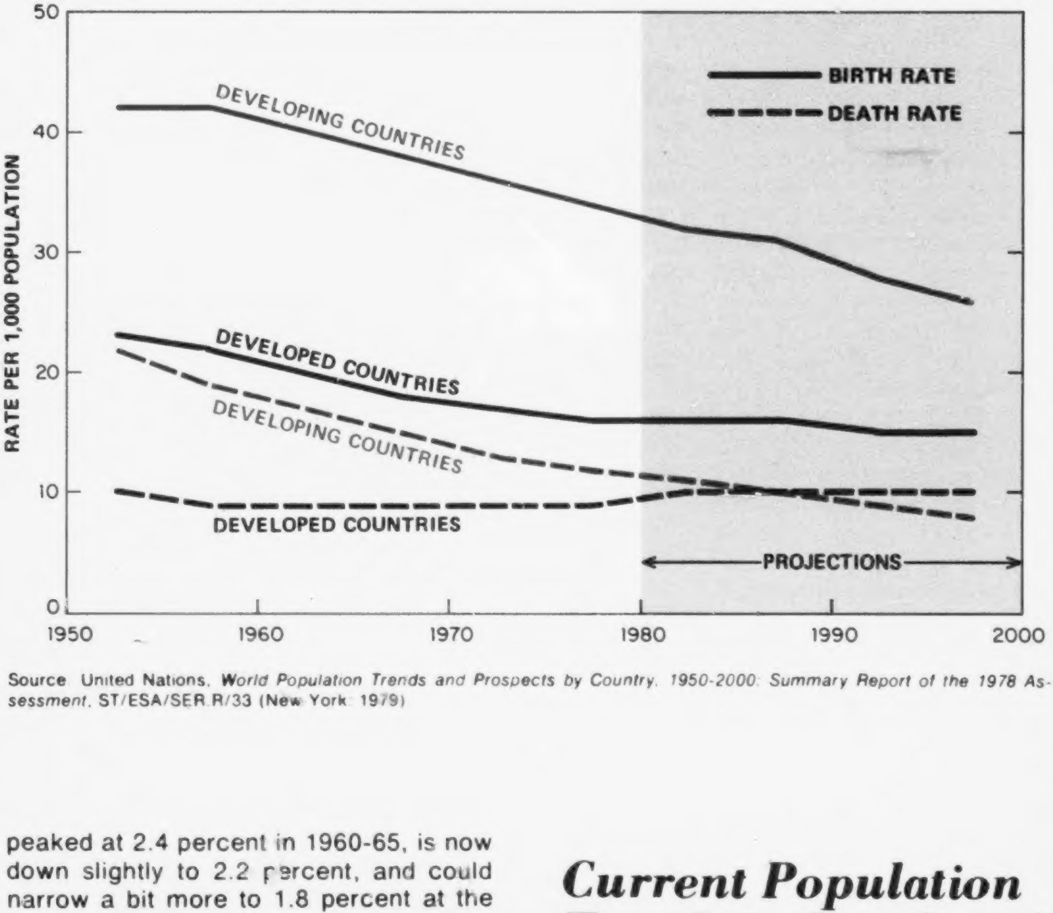
While LDCs have made progress in fertility decline, the spectacular post-World War II progress in reducing mortality has been slowed. In the mid-1950s, life expectancy at birth in LDCs as a whole was increasing annually by 0.7 years. By the early 1970s, the annual gain was down to 0.4 years.[17] The slowdown was most marked in Latin America and in such Asian countries as Sri Lanka, where life expectancy had risen by a spectacular two years annually in the early 1950s, but actually declined between 1967 and 1971. Infant mortality has also risen recently in Sri Lanka and in the swelling cities of Latin America.

It had been expected that life expectancy gains would slow in the developing world once imported medical technologies and health services gained control over such infectious diseases as malaria, smallpox, and tuberculosis. But the slowdown came earlier than anticipated. The United Nations predicted in 1962, for example, that by the early 1980s, life expectancy at birth would stand at 65 years for the "vast majority of the world's peoples."[18] But it is now still in the 40s and low 50s for much of the Third World.

The slowdown which economist Davidson Gwatkin calls "the end of an era" seems related to the rise of dysentery, diarrhea, and pneumonia as leading causes of death, particularly among infants and children. These diseases, often precipitated by malnutrition, are harder to control with modern medicine and physician- and clinic-based health services. Eradicating them takes improved living conditions, especially more and better food and education. For most developing countries, rapid population growth has frustrated this possibility.

The beginnings of fertility decline in many LDCs and the slowdown in mortality decline have combined to stop the steady rise in the world's rate of population growth. The peak was probably passed somewhere in the mid-1960s—a "demographic watershed of historic proportion."[19] The world's birth rate fell below 30 for the first time on record around 1975 and by 1977 was at an unprecedented 28 per 1,000 population.[20] According to the United Nations, the rate of population growth in LDCs as a whole

Figure 7. Birth and Death Rates: Developed and Developing Countries, 1950-1980, and Projections to 2000



Source: United Nations, *World Population Trends and Prospects by Country, 1950-2000: Summary Report of the 1978 Assessment*, ST/ESA/SER.R/33 (New York: 1979)

peaked at 2.4 percent in 1960-65, is now down slightly to 2.2 percent, and could narrow a bit more to 1.8 percent at the end of the century (see Figure 7). The total world growth rate is then projected to be 1.5 percent as compared to about 1.7 percent in the late 1970s.

Though encouraging, these trends still add up to huge numbers. As noted, the current 1.7 percent world growth rate is adding some 74 million a year to today's global total of about 4.3 billion. By 2000, 20 years hence, the United Nations projects a total world population of 6.2 billion, with the lowered growth rate of 1.5 percent translating into an annual net increase of about 93 million people. Some 90 percent of the 2 billion increase in the next two decades will take place in the developing world.

Current Population Trends in Developed Countries

The developed world's already low birth rates have sunk even lower in recent years and are now generally in the mid-teens, less than half the birth rates of the developing world (Figure 7). Death rates have also fallen to levels about as low as they can go without breakthroughs in conquering chronic diseases which strike mostly in old age—heart disease, cancer, and stroke. In some countries, death rates are rising as increasing proportions of the population are composed of the elderly among whom death is more likely.

Fertility is at or below replacement level in some 14 developed countries, including the U.S. Indeed, fertility is now as low as, or lower than, mortality in Austria, Belgium, East and West Germany, Luxembourg, Sweden, and the United Kingdom.[21] Overall, however, population is still growing by 0.7 percent annually among the quarter of the world's peoples living in more developed countries, as seen in Figure 7. The U.S. now has below-replacement-level fertility of about 1.8 births per woman, but because of the momentum factor there were 1.4 million more births than deaths in 1978. The U.S. population is thus still growing by about 0.6 percent a year from natural increase. Net legal immigration of about 400,000 annually raises the U.S. population growth rate to 0.8 percent and illegal immigration adds more, although no one knows the exact amount.

Approaching population stabilization and even decreases in absolute numbers have aroused concerns in some developed countries. Eastern European countries, fearing labor shortages in the future, have stepped up pronatalist incentives—child bonuses, and paid leave and supplementary income for working mothers, for instance, and Czechoslovakia, Hungary, and Romania have somewhat tightened their very liberal abortion laws. These measures appear to have had some effect: except for East Germany, birth rates are now in the upper teens in Eastern Europe.

In the U.S., the prospect of a doubling in the elderly proportion of the population (age 65 and over) from 11 percent about 1980 to 22 percent about 2030 when the post-World War II baby boom generation reaches retirement age has aroused concerns about strains on the worker-supported social security system. There will then be only about 3 persons of working age (15-64) for every person of retirement age, in contrast to the current 6 persons aged 15-64 for every retiree.

Developed countries have had and will have a long time to prepare to meet these potential problems presented by current low fertility and resulting changes in population age structure. For developing countries, the very different and massive problems created by their explosive population growth are with them and the whole world now.

Consequences of Rapid Population Growth

The consequences of rapid population growth are evident across the spectrum of human, animal, and plant life. In the less developed world, despite the recent slight slowdown, population is still growing in some countries at rates that could double the numbers of people in just over 20 years. These countries are already hard pressed to supply their current populations with decent living conditions. In countries like the U.S. that have undergone the demographic transition, the problem seems to be of a different order of magnitude. A growth rate of under 1 percent, which would take a century or more to double a country's population, seems less threatening. Yet when put in the context of other global challenges, including continuation of economic progress, balancing world supplies of food, energy, and natural resources, and preservation of the global environment, the growth of the industrialized countries appears nearly as critical.

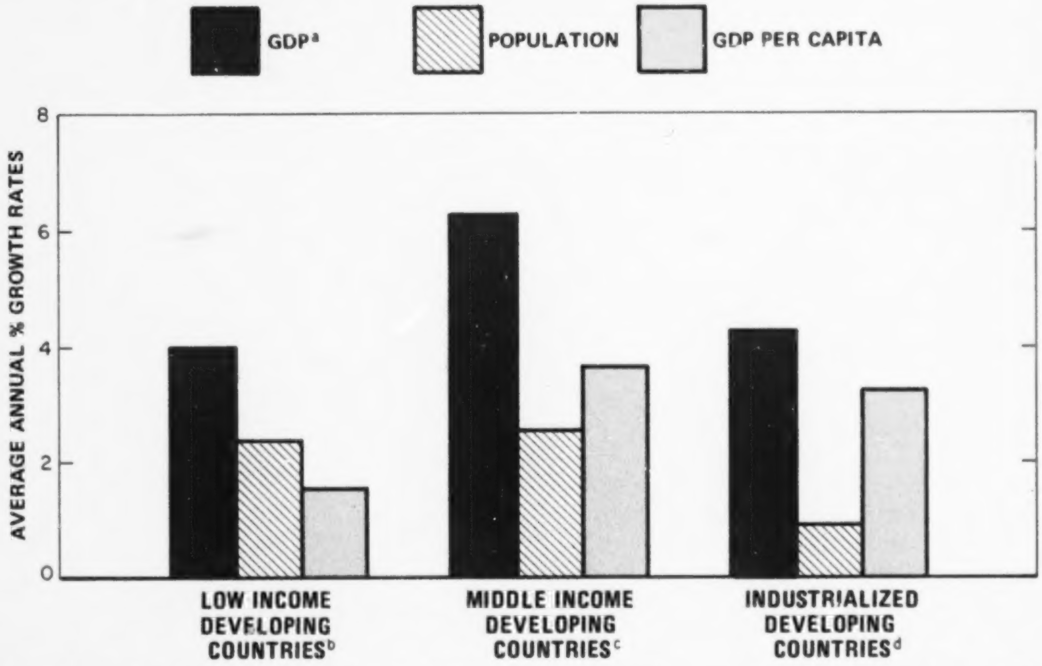
Economic development

Besides exporting the medical and public health revolution to the rest of the world, the Western industrialized nations have also tried, since World War II, to speed economic development and hence raise levels of living in the developing world. Improving living conditions requires that economic growth significantly outpace population growth. As Figure 8 demonstrates, from 1960 to 1976, overall economic growth in low-income developing countries nearly matched that of the industrialized countries, and economic growth in middle-income LDCs was spectacular. But because of much more rapid population growth, the developing world's gain in income *per capita*, and thus levels of living, was much less.

Rapid population growth diverts resources that might otherwise be available for investment in development. As Ambassador Marshall Green, former Coordinator of Population Affairs for the U.S. Department of State, succinctly puts it:

> "When you have a country like Bangladesh, where the population growth every year is over 2 million people, you have to have 400,000 more tons of grain, 700,000 more jobs, 300,000 more dwellings, and 11,000 more schools. How are you ever going to aggregate the capital necessary for development when infrastructure costs are so enormously high?"[22]

Figure 8. Average Annual Growth in Gross Domestic Product, Population, and GDP Per Capita: Developed and Developing Countries, 1960-1976



Source: World Bank, *World Development Report, 1979* (New York: Oxford University Press, 1979) Figure 12. Reproduced with permission.

[a] *Gross domestic product* (GDP) is the value of goods and services produced in a country. *Gross national product* (GNP) adds in the net income received from abroad either from investments or citizens' earnings outside the country.

[b] Per capita GNP of U.S. $300 and below in 1977.

[c] Per capita GNP above $300 in 1977.

[d] Includes Australia, Austria, Belgium, Canada, Denmark, Finland, France, West Germany, Iceland, Ireland, Italy, Japan, Luxembourg, The Netherlands, New Zealand, Norway, Sweden, Switzerland, United Kingdom, U.S.

Note: These data exclude countries which the World Bank classifies as *Capital Surplus Oil Exporters* (Kuwait, Libya, Oman, Qatar, Saudi Arabia, and United Arab Emirates) and *Centrally Planned Economies* (Albania, Bulgaria, China, Cuba, Czechoslovakia, East Germany, Hungary, North Korea, Mongolia, Poland, Romania, and the U.S.S.R.)

With up to 70 percent of the population in many LDCs dependent upon agriculture, an important key to economic development is improvement of the agricultural sector. But it is in the agricultural areas of these nations that fertility is usually highest. The result is either out-migration or more and more people on the land, further subdivisions of family holdings, lower output per worker, and a perpetuation of poverty. Similarly, in many developing countries, family size is usually highest among the poor. With many dependents for each working member, resources are spread too thin to allow for the "investments" beyond sheer survival, such as education, which might help these families lift themselves out of poverty.

The discouraging cycle of development handicapped by excessive population growth, and of rapid population growth continuing because the majority of families perceive little chance for economic progress, can be overcome only through a variety of carefully formulated, vigorously pursued measures adapted to each country's needs. But one of the principal requirements in most less developed countries is clearly the earliest possible reduction of high fertility rates.

Employment

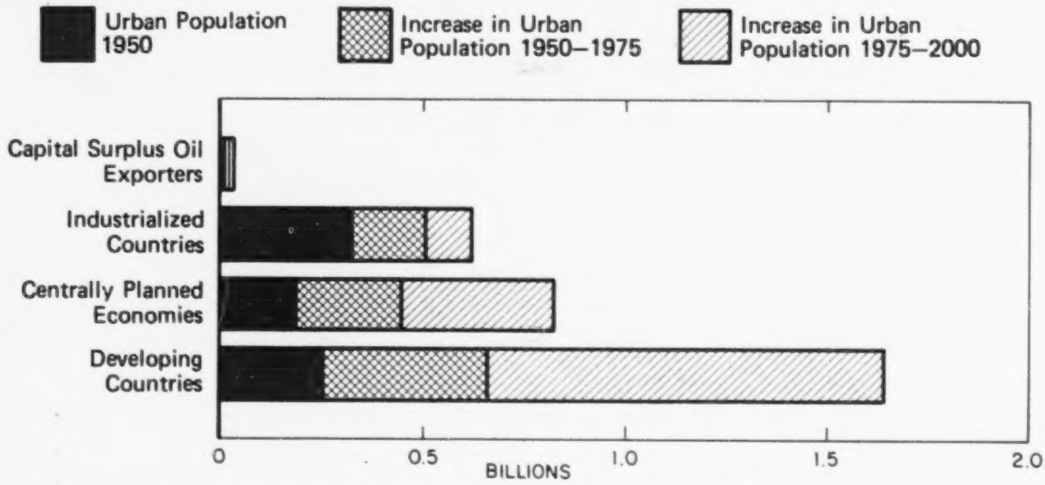
In the two remaining decades of this century, the disheartening effects of past and future population growth in developing countries may be most evident in their exploding labor forces and cities.

Unemployment has become a major problem in the developed world during the 1970s with recurring recessions associated with soaring energy prices coinciding with the coming of age of the post-World War II baby boom generation. But in developing countries the problem is far more daunting and is worsening. The International Labour Office (ILO) estimates that in 1975 there were around 283 million people unemployed or underemployed in the non-Communist developing world—40 percent of the workforce of some 700 million outside China and other Communist countries.[23] About 33 million of these were wholly unemployed; the rest underemployed, that is, seeking additional work either because they worked only a few hours in the day or days in the year or because their income was inadequate to meet their basic needs.

According to the ILO, the high and in some cases rising population growth rates of the late 1960s and early 1970s will translate into an increase in the developing world's labor force from 1.13 billion in 1975 to 1.91 billion in 2000.[24] With these 780 million new workers added to the 283 million currently unemployed or underemployed (outside China), this quarter century will see the need for more than a billion new jobs in the developing world where job-creating development is proceeding all too slowly. Particularly worrisome is the high projected labor force growth—and hence probably also unemployment—among urban youth aged 15 to 24, politically and socially the most volatile of all age groups.

Job shortages have already forced millions of would-be workers to migrate from developing countries. The World Bank estimates that industrialized countries of North and West Europe currently have over 6 million workers from Northern Africa and less developed countries of Southern Europe such as Yugoslavia and Portugal.[25] Leonel Castillo, former Commissioner of the U.S. Immigration and Naturalization Service, has placed the number of illegal migrants now in the U.S. at 3 to 6 million, the majority of them from Mexico.[26] Over the long run, lower fertility and economic progress in developing countries should reduce the supply of excess labor. Meanwhile, the "escape valve" causes social problems for migrant workers and the host countries and complicates international relations. This is nowhere so true as with "undocumented aliens" in the U.S. Some people are also concerned

Figure 9. World Urban Population Estimates and Projections: 1950-2000



Source: World Bank, *World Development Report, 1979* (New York: Oxford University Press, 1979) Figure 10. Reproduced with permission.
Note: For countries included in these four categories, see Figure 8.

that the increasing, if unknown, contribution of illegal immigration to net population growth in the U.S. dims the prospect of this country's reaching zero population growth. In Europe, recruitment of foreign labor has tightened with the economic slowdown since 1973 and several countries have subsidized the return of foreign workers to their native lands.

Urbanization

By the year 2000, over half the world's population is likely to be living in towns and cities, up from 39 percent in 1975. For developing countries, this worldwide phenomenon presents very different prospects from what it did in the past for the now developed world. As the World Bank puts it:

> "Whereas urbanization in the industrialized countries took many decades, permitting a gradual emergence of economic, social and political institutions to deal with the problems of transformation, the process in developing countries is occurring far more rapidly, against a background of higher population growth, lower incomes, and fewer opportunities for international migration."[27]

Enormous numbers of people are involved. Between 1950 and 1975, the urban population of developing countries grew by some 400 million people. Between 1975 and 2000, the increase will be close to one billion (Figure 9).

The problem is aggravated by the concentration of urban dwellers in very large cities. In 1950, only one city of the developing world (Greater Buenos Aires) had a population over 5 million, compared to five such cities in the industrialized countries. By the year 2000, according to World Bank projections, the developing world will have about 40 cities this size and the developed world 12. Eighteen cities in developing countries are expected to have more than 10 million inhabitants, and one at least—Mexico City—may well have three times that number.

Contrary to what is often believed, the flight of job searchers from rural areas is not always the main factor in the developing world's relentless urban growth. In Latin America, for example, where more than half the population already lived in urban areas in 1975, rural-urban migration is expected to slow considerably in the coming decades and the growth in urban dwellers to three-quarters of the region's population in 2000 will be due mainly to natural increase (the excess of births over deaths) within cities. In the low-income countries of Asia, living and working conditions are generally no better in cities than in rural areas, a fact which discourages rural exodus. But this region already has some of the world's largest cities and urban populations: in 1975, for example, the urban population of India was greater than the combined urban populations of Argentina, Brazil, and Mexico.[28]

Whether due to rural-urban migration or natural population increase, it is clear that burgeoning population is putting tremendous pressure on the abilities of LDC cities to cope. In many of these cities, more than half the population lives in slums and squatter settlements; between one-fourth and one-third of the population has no access to safe water supply or facilities for human waste disposal; and people live five or six to a room, acutely aware of the great disparity between the poverty of the majority and the wealth of the urban elite. All this contributes to alienation and frustration on a massive scale.[29]

Public services

In rural and urban areas alike, the populations of many less developed countries are growing faster than educational, health, sanitation, transport, and other public services can be provided.

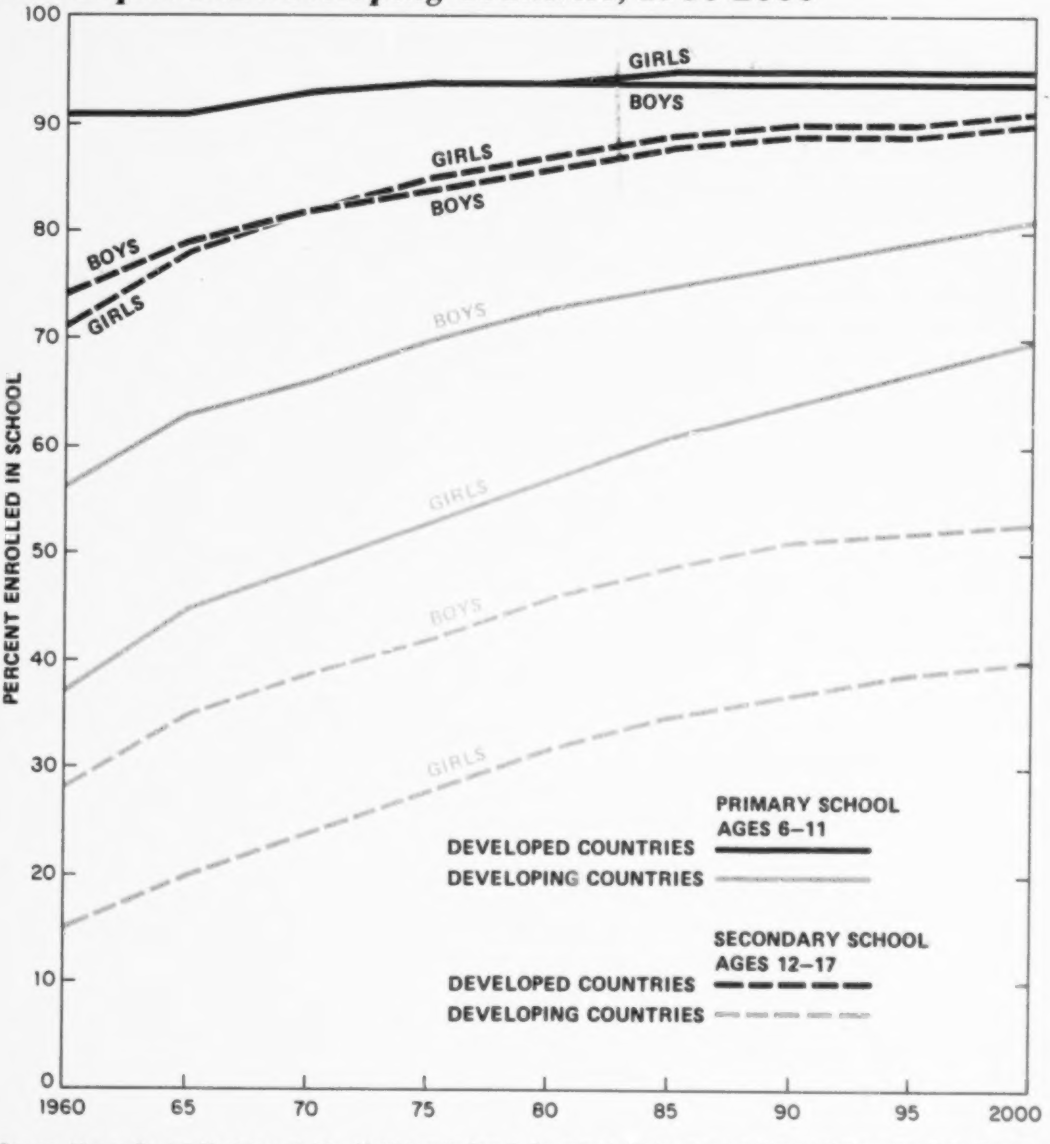
Most LDCs have made heroic efforts to improve educational opportunities, and the proportion of school-age children enrolled in school has indeed been rising. Nevertheless, the gaps in enrollment between developed and developing countries, and between boys and girls in developing countries, remain large and, according to UNESCO, will remain large to the end of the century (Figure 10, page 24). Moreover, despite growing enrollment rates, fast-growing populations of young people mean increases in the absolute numbers of children out of school. UNESCO estimates that there will be 130 million children aged 6-11 out of school in developing countries in 1985, up from 119 million in 1970.[30] Similarly, the *number* of illiterate adults worldwide increased from 700 to 800 million between 1950 and 1975 even though the *proportion* of such adults dropped from 44 to 32 percent during that quarter century.

Housing is a particularly critical problem. In Asia, the backlog of needed housing units in urban areas increased from 22 million dwellings in 1960 to 72 million in 1975; in Asia's rural areas, the need for housing units went from 125 to 219 million in the same 15 years.[31]

Health facilities are on a similar treadmill. Inability to keep up with the demand from growing populations is part of the explanation for the recent slowdown in mortality declines in less developed countries. The World Health Organization estimates that 80 to 90 percent of rural populations in developing countries have no access to health care. The urban poor are scarcely better off. In Sao Paulo, for example, infant mortality has recently risen, malaria and bubonic plague have reappeared, and meningitis reached epidemic proportions in 1974.[32] Experience with community-based health systems in a growing number of countries such as Colombia, Jamaica, and particularly China shows that expanded use of paramedical personnel trained to perform routine health services can help meet some of the need. But unless population growth can be slowed, this approach will still leave vast unsatisfied health requirements.

Though rapid population growth puts pressure on public services, the experience of Sri Lanka demonstrates that special efforts to make such services available to all of a developing country's people can actually help lower that growth. Sri Lanka launched a family planning program in the mid-1960s, but much of the sharp fall in its birth rate

Figure 10. Percent of Boys and Girls Enrolled in School: Developed and Developing Countries, 1960-2000



Source: Magda Cordell McHale and John McHale with Guy F. Streatfeild, *Children in the World* (Washington, D.C.: Population Reference Bureau, 1979) p. 56, based on data supplied by UNESCO Office of Statistics.

Note: Developed countries include all of Europe, U.S.S.R., Japan, U.S., Canada, Australia, New Zealand, Argentina, Chile, Uruguay. Developing countries include all others.

from 33 to 26 per 1,000 between 1965 and 1977 is attributed to rapid improvements in education, health, and nutrition which resulted not from gains in per capita income, which remains at a low $200, but from the country's heavy emphasis on mass-oriented social expenditures.[33]

Food

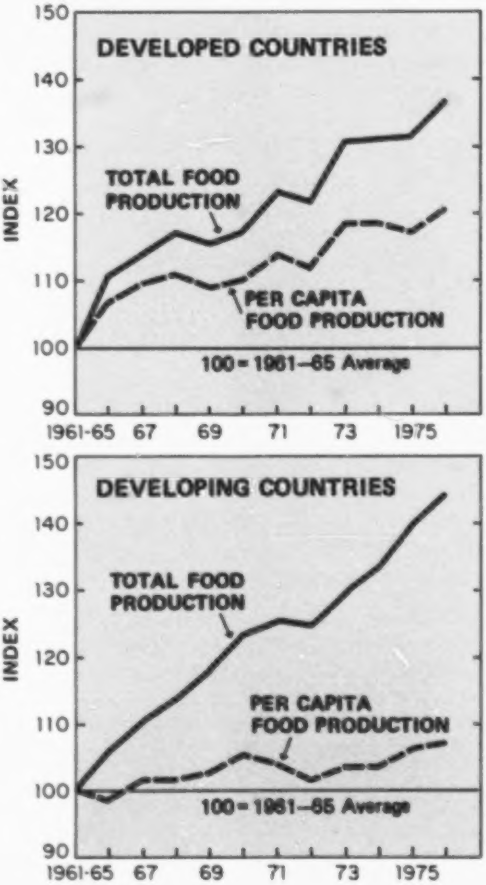
Since World War II, food production worldwide has increased at a slightly faster rate than population. But most of the improvement in food supply *per person* has been in the already well-fed industrialized countries.

From 1961 through 1976, developing countries as a whole improved food production at a faster rate than developed countries, but because of rampant population growth, their per capita food output grew at a much slower pace (Figure 11). The gain in per capita food production averaged a steady 1.4 percent in industrialized countries during this period. In developing countries, by contrast, annual per capita gains were already below 1 percent in the 1960s and nearly vanished in the early 1970s when droughts slashed yields across Asia and Africa. With better weather, expanded irrigation, and other investments, agricultural production has since improved in the developing world, particularly in Asia, but the situation remains precarious. In India, for example, the 20 million tons of grain reserves collected during four years of good harvests are expected to be drawn down heavily following 1979's late and erratic monsoon rains and poor harvest.[34]

Average per capita food intake in the developing world in 1972-74 was about 2,210 calories a day, compared to 3,380 in the industrialized countries. A 1977 U.N. Food and Agriculture Organization (FAO) survey found that in 44 developing countries per capita daily calorie supplies actually declined between 1961-63 and 1972-74.[35]

The developing world's low *average* intake figure fails to reveal the depth of the problem. Their starchy diet, made up mostly of grains and tubers, is less nutritious than the daily fare of developed countries. And the impoverished majority of people within developing countries fail to get as much as the average indicates since the wealthier get more. The FAO estimates, conservatively, that 455 million people in the developing world in 1972-74 were chronically undernourished, that is, failed to get enough food to "lead a full, healthy life." This was up 54 million over 1969-71, "largely because of population growth."[36] Surveys indicate that "up to 50% of all young children in the developing world may be inadequately nourished"—a deprivation likely to lead to lasting physical and mental damage for those

Figure 11. Total and Per Capita Food Production: Developed and Developing Countries, 1961-65 to 1976



Source: Food and Agriculture Organization of the United Nations, *The Fourth World Food Survey*, 1977 (Rome: 1977) Figure 1.

Note: Developed countries include all of Europe, U.S.S.R., Israel, Japan, South Africa, U.S., Canada, Australia, New Zealand. Developing countries include all others.

who survive. Many do not survive. Malnutrition-related deaths among children under age five may run as high as 10 million annually, according to a World Bank estimate.[37]

If the developing world's population continues to grow by 2.1 to 2.2 percent a year, the FAO estimates that food supplies available to them must rise by at least 4 percent annually if the "calorie deficit" is to be made up by 1990. To do this will require either massive imports of food or greatly stepped-up agricultural production. Meeting the deficit through imports, sources of which cannot be assured, will force many of the developing nations deeper into debt and limit their ability to finance other capital costs of development, including expanding food production. And even if the imported food and funds are somehow available, equitable distribution and physical movement of the enormous grain tonnages involved in feeding hundreds of millions of people will present tremendous problems.[38]

For a time during the 1960s and early 1970s, much hope for increasing agricultural production was placed in the use of better cultivation methods and especially use of higher yielding strains of wheat and rice—the "Green Revolution." But when introduced to less developed countries, the Green Revolution has proven to carry with it a host of problems. In the words of Paul and Anne Ehrlich:

> "There are serious obstacles to establishing the new technology among small, poor farmers—who grow most of the food in LDCs and who most need help. These socioeconomic problems and the vulnerability of the high-yield monoculture crops to climate changes, water and fertilizer shortages, and pest outbreaks may render the high yields less dependable than present harvests."[39]

Many observers note that, like the high agriculture yields in the developed world, the Green Revolution "miracle grains" take tremendous amounts of energy for irrigation, fertilizer, and mechanized inputs. As cheap energy becomes less available, particularly oil and natural gas, the possibilities of increasing food production in developing nations will be diminished.[40]

Norman Borlaug, who received the Nobel Prize for Peace in 1970 for his work in developing the miracle grains, claims that "producing more food and fiber and protecting the environment can, at best, be only a holding operation while the population monster is being tamed." In a 1979 address he noted that to feed the 4 billion people who would be added to the world's current 4 billion in the next 40 years if growth were to continue at 1.8 percent a year, global food and fiber production would have to be increased during that 40 years by more than it had increased during the entire 12,000 years since the dawn of agriculture.[41]

Increasing acreage devoted to food production faces similar formidable problems. Most of the world's well-watered arable land is already under cultivation. The potentially tillable land left, mainly in Latin America and Africa, would require huge investments for special care of tropical soil or supplementary water supplies in arid regions. Meanwhile, millions of acres of fertile farmland are lost each year because of the growth of cities, erosion, formation of deserts, salinization, overgrazing, and poor management. The U.N. Environment Programme sees twice as much land being lost to these factors by the end of this century as the amount expected to be brought into agricultural production. The U.S., the world's major grain exporter, currently loses about one million acres of prime farmland each year to urbanization and other uses, according to the Council on Environmental Quality.[42]

Minerals and energy

In the past two decades, much has been written about an inevitable "collision" between finite global resources of minerals and energy and spiraling popula-

World Bank photo by Jaime Martin

Stacking grain in Guatemala. A host of problems have dimmed the Green Revolution's promise for increasing agricultural production in developing countries.

tion growth in developing countries, coupled with high consumption in developed countries.[43] In these circumstances, it is claimed, developing countries as a whole could never hope to catch up with the developed nations' living standards of the 1970s, let alone the levels those nations might attain sometime in the future.

Others have offered a somewhat different view. This was discussed by Resources for the Future researchers Ronald Ridker and Elizabeth Cecelski in the August 1979 *Population Bulletin*, "Resources, Environment, and Population: The Nature of Future Limits."[44] For the near term, they see the problems to be faced as "associated less with physical exhaustion of resources than with their unequal distribution and the transition problems of moving from one resource regime to another in an orderly fashion. . . . Poverty-stricken countries and impoverished groups within countries can only be helped by lifting the barriers to the flow of resources, knowledge, and technical and managerial skills into, and/or people, out of these regions."

For the long term, they believe that "there is no danger that the world will 'run out' of minerals as a whole." Minerals and materials like aluminum, plastic, and glass from "virtually inexhaustible sources" can substitute for less abundant minerals like tin, tungsten, and lead, "provided that sufficient energy is available at reasonable cost, both economic and environmental." As for that energy, Ridker and Cecelski agree, like most observers, that the world's prime sources of energy of the past 25 years—oil and natural gas*—will be essentially exhausted sometime after the turn of the century. In the coming decades, coal, oil from shale and tar sands, and nuclear fission—if its safety problems can be resolved—can play an increasing role. Over the long term, solar energy in its various forms and possibly nuclear fusion can provide sources of renewable or "virtually inexhaustible" energy, they say. These new sources of energy could be expensive, they warn, although the costs can be expected to come down as their development proceeds.

Ridker and Cecelski's analysis is based on a projected stable world population of about 10 billion—a billion below the current U.N. "medium" projection for the early part of the 22nd century. However, they assert that a slowdown in population growth rates is important in buying time with which to find solutions.

A slowdown in economic growth or resource consumption can buy equally valuable time to make adjustments. However, Ridker and Cecelski point out that an economic slowdown would reduce the trained manpower and capital available to work on the world's resource problems. It could also frustrate developing countries' legitimate aspirations for a decent level of living as international markets for their products and capital for investment dry up. This could intensify the dangers of the growing polarization of economic and political relations between developed and developing nations along "North-South" lines.

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*Surprising as it may now seem, it was only between 1955 and 1960 that oil and natural gas, taken together, began to account for more than 50 percent of total world consumption of commercial energy. Coal still accounted for nearly a third of the total in 1975.[45]

Economic growth is likely to be slower in industrial countries in any case in the coming decades, due largely to higher energy prices forced by oil producers and the cost of developing substitutes. This is likely to slow development aid, according to the International Finance Corporation, forcing the developing nations to "look increasingly to their own resources and initiatives."[46] Among those initiatives, stepped-up efforts to speed the fertility decline already begun should have prime priority.

Others see danger for the world's resource supplies in both the high consumption rates and continuing, if much slower, population growth of industrialized nations. In 1972, with just over 5 percent of the world's population, for example, the U.S. consumed 32 percent of the world's commercial energy.[47] Thus, since per capita consumption is so high, even the slow rate of population growth in this country may have as deleterious a long-range effect on the world's available resources as the much higher growth of an equivalent population in low-consumption developing nations.

WHO photo by P. N. Sharma

A meager day's fish catch in India.

Environment

Even more critical for future generations than rising demands for mineral and energy resources may be the growing pressure of population on the global environment.

In recent decades, the earth's vegetation cover (croplands, forests, and grasslands), fisheries, water sources, and atmosphere have undergone a sharply increased rate of depletion and pollution.

A large part of this is again due to high production and consumption lifestyles, coupled with still-growing populations, in industrialized countries. Environmental degradation has also resulted from the desperate efforts of rapidly growing impoverished populations in developing nations to survive. Vast areas of Africa, South and Southeast Asia, the Middle East, and Latin America have been crippled by slash-and-burn agriculture, overcropping, overgrazing, and consequent wind and water erosion. Ever-growing needs for cropland, firewood, and timber have reduced the world's forest coverage from a quarter of the total land surface 25 years ago to one-fifth today and a projected one-sixth in 2000.[48] Deprived of water-holding cover, millions of tons of virtually irreplaceable topsoil have been washed into the sea.

The problem worldwide is evident in:[49]

- The destruction of vegetation, the source of food and oxygen;
- The leveling off of the world's annual fish catch since 1970 despite stepped-up efforts, due largely to overfishing and pollution of spawning beds;

- Overcrowding and impairment of national parks, wildlife preserves, beaches, and other natural recreational areas;
- Destruction of animal and plant wildlife essential to a healthy ecosystem by farming, timbering, urbanization, pesticide and fertilizer poisoning, and hunting;
- An increase in illnesses such as emphysema, stroke, parasitic infections, heart disease, and cancer caused in part by the introduction of new chemicals into the ecosystem by air and water pollution;
- Water shortages due to the massive water requirements of modern agriculture, mining, industry, and consumer living; depletion of underground water supplies; pollution of lakes and rivers; exhaustion of promising water catchment and irrigation sites; and increasing acidity of rain;
- Damaging rainfall and temperature pattern changes brought on by increasing carbon dioxide in the atmosphere from the burning of wood and fossil fuels, dust from urban and agricultural activity, and the thermal effects of waste heat and economic activity.

This environmental loss and damage is occurring in a world of 4 billion people. In 20 years, the number of human consumers and polluters is expected to be around 6 billion and still growing.

Public awareness of environmental deterioration has grown enormously in the past decade, especially in industrialized countries where pollution from automobiles and industry is most obvious. But despite the passage of increasingly stringent antipollution regulations, the U.S. and other industrial countries are moving less rapidly than they might to control their environmentally destructive lifestyles. In the developing countries, where funds for conservation and antipollution measures are scarce and dependence on natural resources for survival is heavy, more determined efforts to slow population growth would be a key contribution to their own and the world's efforts to preserve the environment.

U.S. Bureau of Land Management

Stripmining in Montana.

World Response to the Problem

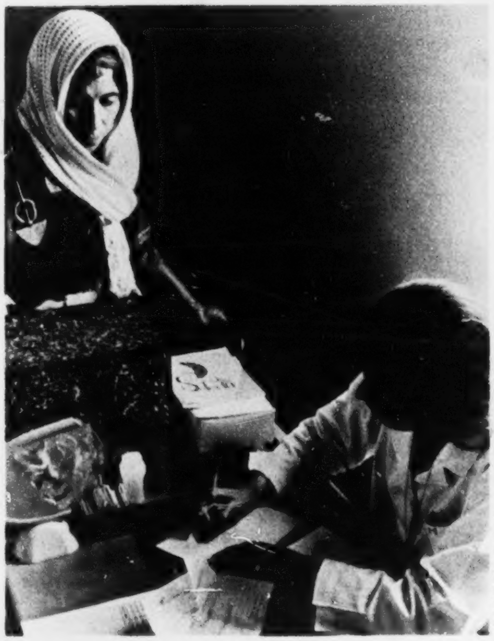
Over the past ten to 15 years, there has been an encouraging increase in world awareness of population problems. Many developing countries have seen the need for urgent action to reduce rapid population growth if their development efforts are not to be greatly impaired or totally frustrated. In 1960, of *all* countries in the world, only India and Pakistan supported organized family planning programs, both for the avowed purpose of reducing birth rates. By 1978, 35 less developed countries—with 77 percent of the developing world's population—had official policies to reduce population growth. Another 30, with 15 percent of LDC population, supported family planning programs for other than demographic reasons. Only 7 percent of the developing world's people lived in the 66 nations that have no family planning activities.[50]

By 1976, according to an International Planned Parenthood Federation (IPPF) survey, $670 million was being spent annually on family planning program support by LDC governments themselves and another $314 million was provided to developing country programs by the U.N. Fund for Population Activities (UNFPA), IPPF, the World Bank, numerous private foundations, and at least nine governments of the developed world.[51] U.S. assistance, administered through the Agency for International Development (AID), provided two-thirds of the $2.1 billion total external assistance over the 1965-78 period, either directly to the countries concerned or indirectly through programs sponsored by private organizations and intermediary agencies such as IPPF and UNFPA.[52]

Family planning "versus" development

Family planning programs in less developed countries vary widely in quality and effectiveness. As former Population Council researchers Mauldin and Berelson put it, these programs "range from vigorous and continuous efforts under skilled management to weak and spotty performance under indifferent administration, on down to no effort at all."[53] How much of the recent fertility decline in LDCs can be attributed to these organized programs? Would birth rates have come down anyway as social and economic development increased couples' motivation to reduce family size, in line with the classical demographic transition theory? These questions have been hotly debated in recent years as the world seeks ways to speed fertility decline in an effort to ward off potentially disastrous overcrowding, deprivation, and disorder.

In the studies mentioned earlier, both published in 1978, Mauldin and Berelson and Tsui and Boque attempted answers. They examined the less developed countries' record in achieving progress in social and economic factors which research suggests are associated with fertility reduction: per capita gross national product, urbanization, life expectancy, literacy, school enrollment, proportions of males or females employed off the farm, and rates of infant survival. For the same time periods, they ranked LDCs according to the strength of their family planning programs from the top (expressed public commitment of political leaders) to the bottom (actual delivery of services). Both studies found that family planning program effort had a significant, independent effect in reducing fertility over and above the effect of socioeconomic progress. However, the key finding appears to be, as Mauldin and Berelson state, that "the two—social setting and program effort—go together most effectively. Countries that rank well on socioeconomic variables *and also* make substantial [family planning] program effort have on average much more fertility decline than do countries that have one or the other, and far more than those with neither."[54]



World Bank photo by William Graham

Family planning in Tunisia.

Before these findings were published, the same questions were hotly debated at the 1974 World Population Conference in Bucharest. As noted, many Third World delegates, pointing to the fertility declines that occurred without benefit of birth control pills or family planning programs as the U.S. and Europe industrialized, argued that "development is the best contraceptive." They put priority on economic aid from richer countries while the U.S. and other delegations from developed countries sought commitments to making family planning services universally available and setting target dates for lower birth rates. In the end, 136 participating governments (excluding only the Holy See) reached consensus on a World Population Plan of Action (WPPA) that, as IPPF Secretary-General Carl Wahren observed in 1979, "put population squarely where it belongs 'within the broader context of internationally adopted strategies for national and international progress.'"[55]

The WPPA advocates a philosophy of "population *and* development." Action is urged to both enhance couples' motivation for small families and provide couples and individuals with the information and means to achieve their desired number and spacing of children, a decision which is guaranteed as a "basic human right."

Motivation for small families

At Bucharest and before, it was recognized that the broad economic and social development thought to be necessary before most couples will opt for small families would be a long time in coming for many less developed countries. But research and experience seemed to show that particular elements of development are especially effective in bringing down birth rates. These were listed in paragraph 32 of the WPPA and include the following:

Reduction of infant and child mortality. When parents can be assured that more of their children will survive to adulthood, they generally have fewer "insurance" births. (The new findings on Europe's demographic history and from Latin America today suggest that the relationship between infant mortality and fertility may be more complicated than once thought.)

Expansion of basic education, especially for girls. Studies in Latin America reveal that women who have completed primary school average about two fewer children than those who have not. For both men and women, education broadens views of life's opportunities and potentialities and reduces resistance to social change, including family planning. It also enhances a girl's chances of employment outside the home that give her alternatives to raising a large family. And parents see children in school as having less immediate economic utility but greater long-term earning capacity; this encourages a smaller, well-educated family norm with children better able to care for parents in their old age. Over the long run, motivation for small families should also be encouraged by incorporating population education into school curricula, as is now being done in many developing nations.

Enhancing the status of women. In addition to increasing women's opportunities for education, most observers agree that enhancing the general status of women socially, economically, and politically could contribute more than any other measure to reduced fertility. When women are accorded esteem for roles other than as mothers or unsalaried house and farm workers, the response is very likely to be smaller families.

More equitable distribution of the benefits of economic growth. Typically in developing countries, the upper 20 percent of the population receives about 55 percent of the national income and the lowest 20 percent about 5 percent.[56] A large proportion of the population remains outside the development process. Experience in Taiwan, South Korea, Sri Lanka, and the state of Kerala in India indicates that economic growth is likely to have the most beneficial effects on fertility where the masses share equitably in that growth through increased income, employment, and access to land and health and education facilities. Large numbers of children are then no longer needed for the little they

World Bank photo by Ray Witlin

Literacy class in Upper Volta. Educating girls may be one of the most effective approaches to reducing fertility in developing countries.

can add to family income while young, or later to support elderly parents. The escape from chronic insecurity and deprivation makes long-term planning and individual control over life's choices, including family size, seem more feasible and acceptable. And with more chances to earn and spend money and time outside the family, parents are likely to find material possessions and lifestyles competing with having numerous children.[57]

Raising the age of marriage. Mauldin and Berelson estimated that 35 to 40 percent of the 1965-75 birth rate decline in the developing countries they studied was accounted for by rising age at marriage, especially of women. This appears to be influenced by more education and employment for women and the "drive to improve socioeconomic status," as in Sri Lanka where the average age at marriage is among the highest in the developing world—28 for men and 24 for women. It may also result from direct intervention as in China where the government urges an "optimal age of marriage" of 28 for men and 25 for women in urban areas, and 25 and 23 in rural areas.

Policy in action

Five years later, the "message of Bucharest"—population *and* development—seems to have been absorbed by developing countries and donors in developed countries alike. But a 1978 joint study by the Organisation for Economic Co-operation and Development (OECD) and the World Bank reports that "it is not proving easy to translate the concept of population *and* development into actual operational programs."[58] On the donor side, the World Bank is trying to introduce population "components" into its projects in other development sectors. AID has been mandated by the U.S. Congress to examine the likely "population impact" of all new development activities and to stress areas, such as education, likely to encourage reduced fertility. But, as in pre-Bucharest years, external aid for population programs remains at just under 2 percent of overall development assistance and, aside from the World Bank and

AID initiatives, there seems to have been little deliberate effort to push particular activities in the other 98 percent of development aid simply because of their presumed effect on reducing fertility.

On the side of the developing countries, reports the OECD/World Bank study, "Despite the Bucharest call for development approaches, family planning remains the prime strategy for implementing population policies." The demand for assistance has risen, far outstripping the $120 million budget of the UNFPA in 1979, for example, but that increased demand has been more than ever for "family planning and related population activities of the pre-Bucharest type."

Recent family planning success stories

At the time of the 1974 Bucharest population conference, family planning in the developing world could boast of successes only in the special city-states of Singapore and Hong Kong, or in such countries as Taiwan and South Korea where fertility had started downward before government programs began and where there was considerable socioeconomic development. It was not clear that family planning programs could trigger the transition from high to low birth rates in other countries which did not enjoy similar economic progress. But since then, several family planning program success stories have demonstrated that much can be achieved in circumstances that appear far from ripe ground, as judged by classical demographic transition theory. If these successes can be repeated elsewhere, the prospects for accelerated fertility decline in the coming decades could be much improved.

Chief among these successes is China, with a per capita income of about $410 and a huge agrarian population only 30 years removed from age-old traditions of large families. With over a fifth of the world's population at some 960 million at the end of 1978, what happens in China has enormous bearing on the future size and growth rate of the world's population. According to recent government statistics, China's birth rate at the end of 1978 was down to 20; its death rate was 8; and the rate of natural increase was thus 12 per 1,000, or 1.2 percent.[59] This was equal to the U.S. rate of natural increase in 1964.

The elements of China's success include community-based, free provision of all birth control methods, including sterilization and abortion, by teams of trained, local "barefoot doctors," one of which is always a woman; locally planned and implemented birth quotas; and attempts to integrate women fully into all aspects of society.

On June 18, 1979, Premier Hua Kuofeng declared to the National People's Congress that the government now aims for a natural increase rate of 1 percent in 1979; 0.5 percent by 1985; zero growth by 2000; and, over the long run, a negative growth rate that will reduce the absolute size of the total population. In pursuit of this ambitious goal, a "birth planning law" is now being shaped to encourage the one-child family. Under discussion are proposals to reward one-child couples with substantial child care subsidies until the child reaches 14, priorities in housing and the child's schooling, and—most important—a generous monthly pension upon the parents' retirement, even for rural peasants who now receive no such benefit.

Another success story is found in the densely packed, overwhelmingly rural and poor island of Bali, Indonesia, where two-thirds of women are unschooled. Here, the birth rate fell from 44 per 1,000 at the end of the 1960s to 28 in 1976 when more than half of eligible couples were using modern contraception—up from virtually no use five years earlier before the government family planning program began. Trained village people distribute pills; IUD insertions are readily available; and household heads themselves, through the traditional *banjar* (hamlet) councils, monitor contraceptive use.

In rural, tradition-bound Thailand, the Community-Based Family Planning Services, working side-by-side with an increasingly strong government program, in four and a half years brought low-cost, efficient, pill and condom services, manned by part-time local distributors, to villages containing over 16 million people. In some villages, as many as 80 percent of eligible couples now use modern contraception and the national total fertility rate was down to four and a half children per woman in 1977—two children less than in the mid-1960s.

Bangladesh has a slow-moving administrative system, a per capita income of just $90, and 90 percent of women are illiterate. According to a 1976 national survey, only 14 percent of "ever-married" women had ever used contraception. However, by the end of 1977, after only two years of operation, a nationwide social marketing scheme, launched by Population Services International and working through local shopkeepers, was selling 2 million condoms and over 80,000 cycles of pills *every month* at costs amounting to only $1.40 for every "couple-year of protection."

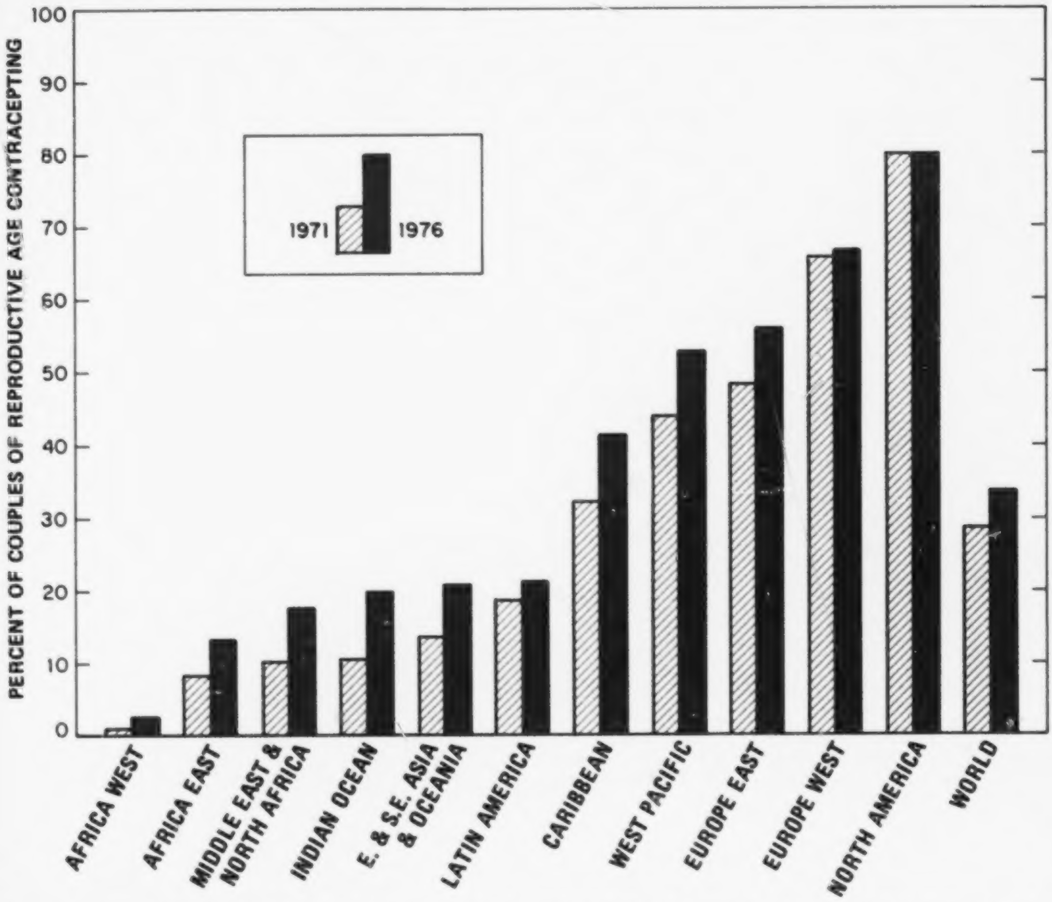
Citing these successes, Malcolm Potts, Executive Director of the International Fertility Research Program, points out their significant factors: access to a full range of effective fertility control methods, including (in China) sterilization and abortion; community involvement; a "realistic use" of paramedics, trained lay people, or local shopkeepers; good management; efforts at self-sufficiency (in Thailand and Bangladesh) with a profit to local distributors and some cash return to the program, even at the very low prices charged to consumers; and, most importantly, resourceful, committed leadership at the top. Potts adds that these successful programs demonstrate that family planning, socioeconomic development, and maternal and child health are "all complementary efforts aimed at improving the quality of human life. Family planning alone can, and sometimes must, make its own direct contribution to health and social progress. But progress will be even more rapid if the fundamental problems of underdevelopment can be tackled from as many sides as the wise management of the limited resources available will allow."[60]

Unmet needs for family planning

Despite specific successes, recent surveys show that family planning still has far to go in the developing world if a massive global population is to be avoided in the future. The International Planned Parenthood Federation (IPPF), in its 1976 Survey of Unmet Needs in Family Planning, found that contraceptive use in over 200 countries taken together had increased only 1 percent a year in the five years since its first such survey in 1971, to reach 35 percent of eligible couples.[61] Contraceptive use was at or below 20 percent in most of the developing world compared to 65 percent and over in developed regions (Figure 12). Moreover, in these five years, the *number* of fecund women worldwide *not* practicing contraception rose from 342 to 361 million, a result of the large numbers of young women entering the childbearing ages. Only half of the world's couples of reproductive age were estimated to have sufficient knowledge of contraception to plan their families. The IPPF report indicated that contraceptive knowledge and practice would have to increase at a much faster pace if the world is to reach even the average family size of just under four children that would be required by 2000 in order to achieve replacement-level fertility about 2045 and a stabilized world population of 15 billion by the year 2100 (see high projection in Figure 6, page 15).

Particularly worrisome was the low level of young people's exposure to education that could change family-size

Figure 12. World and Regional Contraceptive Practice Levels: 1976



Source: International Planned Parenthood Survey of Unmet Needs in Family Planning in 1976, reported in *People*, Vol. 5, No. 3 (London: International Planned Parenthood Federation, 1978) p. 27. Reproduced with permission.

attitudes and encourage accelerated contraceptive use in the generation that will most affect global fertility levels in the coming decades. Estimates for countries outside North America and Europe showed that three-quarters of children under 15 and more than half of youths over 15 still had no access to sex education programs, in school or elsewhere. And in most countries, almost two-thirds of young people had no access to contraceptive methods.

The survey also documented increasing acceptance of sterilization worldwide and abortions running at about 34 million a year, or about one abortion for every three live births in 1976. This figure was down from an annual 55 million abortions estimated in IPPF's 1971 survey. Estimates of illegal abortions came to about the same proportion of the total, despite increasing liberalization of abortion laws in the five years between the surveys.

Findings from the first 15 countries to report in the World Fertility Survey (WFS) indicate that although most women in developing countries now know of

Table 3. Contraceptive Knowledge and Use: World Fertility Survey Findings from 15 Developing Countries, 1974-1977

Country (year of survey)		Percent of ever-married women who have heard of a contraceptive method	Percent of ever-married women who have used a contraceptive method
Asia and Pacific			
Bangladesh	(1976)	82	14
Fiji	(1974)	100	68
Indonesia	(1976)	77	34
Malaysia	(1974)	92	46
Nepal	(1976)	22	4
Pakistan	(1975)	75	10
South Korea	(1974)	97	57
Sri Lanka	(1975)	91	43
Thailand	(1977)	96	45
Latin America			
Colombia	(1976)	96	59
Costa Rica	(1976)	100	82
Dominican Republic	(1975)	97	47
Mexico	(1976)	80	45
Panama	(1976)	98	73
Peru	(1977)	82	49

Source: Sir Maurice Kendall, "The World Fertility Survey: Current Status and Findings," *Population Reports*, Series M, No. 3 (Baltimore: Population Information Program, The Johns Hopkins University, July 1979) Table 13

Note: The World Fertility Survey is a series of surveys that will eventually cover more than 400,000 women in more than 40 developing countries and 20 developed countries. Funded by the United Nations Fund for Population Activities and the U.S. Agency for International Development, it is being conducted by the International Statistical Institute in collaboration with the United Nations and the International Union for the Scientific Study of Population.

at least one contraceptive method, the gap between knowledge and actual practice remains large (Table 3). The most startling contrasts occurred in Bangladesh and Pakistan. In both countries, over 75 percent of ever-married women surveyed knew of contraception but only 14 and 10 percent, respectively, reported ever having used it. In Nepal, 22 percent knew of contraception but only 4 percent had used it. All three countries have national family planning programs but, at least up to 1976, these government programs had evidently been unsuccessful in effectively delivering services and supplies, and in Nepal, information as well.

The WFS findings point up another gap: between the desire to stop childbearing and use of an effective contraceptive method (pill, IUD, injection, sterilization, or condom). About half of the married women surveyed in the 15 countries reported wanting no more children, but about half of this group were not using modern contraception. Accessibility to family planning services helps close this gap. In Nepal, for example, 95 percent of married women who wanted no more children but did not know an outlet for services were not using effective contraception, compared to only 51 percent of those who knew of an outlet within two hours' travel.

The WFS report agrees that socioeconomic changes indirectly and over the long run affect factors like education, age at marriage, and desired number of children that influence couples' knowledge and use of modern contraception. But, like the successes in China, Indonesia, Thailand, and, to a limited extent, in Bangladesh, the WFS findings suggest that, in the short run, contraceptive knowledge, acceptance, and use can be speeded up in the developing world if services are made widely, easily, and conspicuously available. This should accelerate significantly the decline in birth rates recently begun.

The Outlook

What lies ahead? All are agreed that the world's present growth rate of 1.7 percent, which would double human numbers in just 41 years, cannot continue indefinitely. It is also clear, however, that—barring a nuclear holocaust or massive famine—a much larger population lies ahead for the developing countries and the world as a whole. With close to half of the developing world's population now under age 15, the relentless arithmetic of population momentum will carry waves of population growth into the 21st century even if replacement-level fertility—essentially, an average family of two children—were miraculously to be achieved everywhere tomorrow. Just when Earth's population will stop growing and how large it then will be depends crucially on when that worldwide replacement-level fertility is reached. As World Bank President Robert McNamara recently pointed out: "For every decade of delay in achieving . . . replacement-level fertility—the world's ultimate stabilized population will be about 11 percent greater."[62]

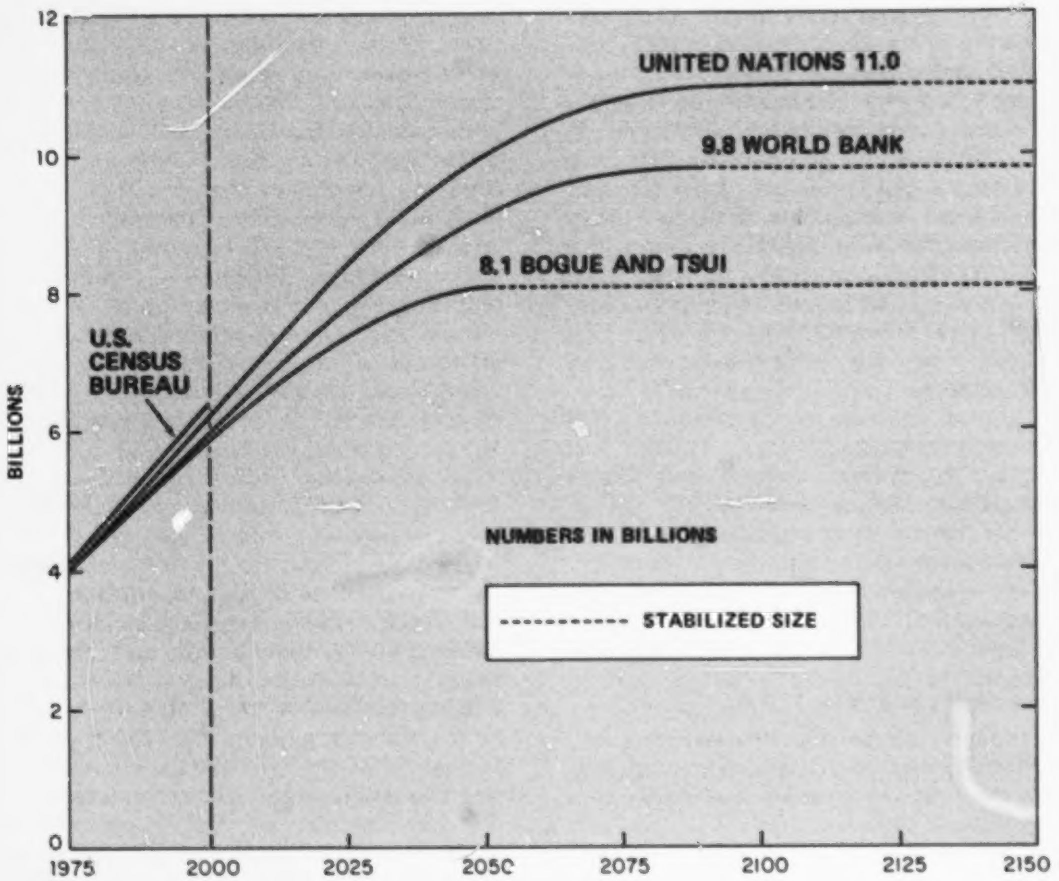
Current "medium" projections for world population in the year 2000, just around the corner, range from a low of 5.9 billion (Bogue and Tsui) to a high of 6.4 billion (U.S. Bureau of the Census)—a difference of "only" half a billion. For further into the future, demographers' opinions vary much more widely as seen in Figure 13 (page 38). Bogue and Tsui predict a rapid slowdown to zero growth and a peak global total population of about 8.1 billion by 2050, provided that family planning programs are pursued vigorously in the developing world and steady gains in social and economic development continue. The most recently published long-range projections of the United Nations put the peak at about 11 billion about a century and a half from now. World Bank estimates fall in between. "If current trends continue," the Bank projects replacement-level fertility for the world as a whole about 2020 and a stabilized population of 9.8 billion some 70 years later.

All these projections depend chiefly on assumptions concerning the pace of fertility decline in developing countries—a pace that could change with unforeseen events or be made to change with sustained will. China, which claims to have cut its rate of natural increase by half (23 to 12 per 1,000 population) in the seven years from 1971 to 1978,[63] could substantially lower the higher projections of eventual world population if its present goal of a nongrowing population by the year 2000 is indeed reached. Other key developing countries are also showing hopeful signs of more rapid than expected fertility decline. Mexico, the world's 11th most populous country at about 68 million in 1979, is now vigorously committed to reducing population growth after a long history of pronatalism. Recent data suggest that its 1975 birth rate of about 40 per 1,000 was reduced to about 35 only four years later, in spite of the enormous number of young people in the childbearing ages.[64] The figures are similar for Indonesia, the world's fifth largest country at about 140 million in 1979.

On the other hand, despite longstanding national family planning programs, almost no fertility decline has been registered in populous Pakistan (80 million in 1979) or Bangladesh (87 million) and their birth rates are still in the mid-40s. India, with about 660 million people, second only to China's some 960 million, has now put off to the mid-1980s a target birth rate of 30 originally hoped for by the late 1970s; contraceptive acceptance rates plummeted following the over-zealous sterilization drive which helped topple Prime Minister Gandhi's government in 1977. Nigeria, Africa's most populous country at 75 million, is not yet convinced that it has a population problem although family planning is supported on health grounds; its high birth rate of 50 may actually be rising. Brazil, the world's sixth most populous country at 119 million, has also supported family planning for health reasons since 1974 but still views a larger population as economically and politically necessary. Though its birth rate may now be down to about 34, Brazil's population is still growing at a high 2.5 percent.[65]

Worldwatch Institute President Lester Brown doubts that a global population as high as 12 billion (an earlier projection of the United Nations) will ever be

Figure 13. Projections of World Population in 2000 and Ultimate Stabilized Size



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Note: The U.S. Census Bureau has not published projections beyond 2000. The World Bank publishes only one series. The other projections shown are medium series (between high and low variants).

reached.[66] He sees crucial biological systems—fisheries, forests, grasslands, and croplands—and oil resources already showing unsupportable strains at the current 4.3 billion. He predicts that further mounting pressures on vital resources, translated into unemployment, lowered per capita income, and inflation, will force restricted childbearing on individual couples and stabilized population policies on governments that do not now have them. To ward off collapse of the earth's major biological systems, Brown urges a "concerted global effort to slam on the demographic brakes" with the aim of halting population growth just short of 6 billion about 2015. This timetable calls for zero population growth in the developed world by 1985—a target already achieved by several industrial countries, as Brown points out. For developing countries, he urges an effort to reduce birth rates to 25 per 1,000 population by 1985, down from the present average of 33, followed by a leveling off for two decades while the current bulge of young people already born moves through their reproductive years, and then a final push to bring birth rates into balance with death rates at a low level by 2015. Brown admits that this "exceedingly ambitious" target would be extremely difficult for African countries in particular where birth rates are now between 40 and 50. But the alternative could be the return of the famines that claimed hundreds of thousands of lives across the southern fringe of the Sahara in the early 1970s. And in achieving the target, Brown observes that "No country would have to reduce its birth rate any more rapidly than Barbados, China, Costa Rica, Indonesia, and Singapore already have."

To speed fertility decline

Efforts heroic enough to meet Brown's timetable are probably unimaginable in the two decades remaining to the 20th century. But clearly birth rate declines must be accelerated now in most LDCs if the world is to avoid an eventual population so massive that the future of humanity and its ecological support system would be jeopardized. The approaches currently being pursued or proposed to speed these declines include both efforts to improve family planning services and "beyond family planning" measures to enhance motivation for smaller families. They can be summed up as follows:[67]

More and improved family planning services. Surveys and experience in Asia and Latin America show that readily available, well advertised services can, in many cases, boost contraceptive practice rates dramatically, even in illiterate, rural, poor populations. A current popular call is for "integrating" family planning services into other development efforts—rural development, nonformal education, and especially health. Here, however, they may get short shrift. More promising is expansion of community-based or commercial distribution of contraceptive supplies. New contraceptive methods which women would use for longer intervals than they now do the pill and the IUD could contribute substantially to fertility declines. A vaginal ring, an improved IUD, and long-lasting implants, expected to be ready for general use in the early 1980s, show such promise. Where available, injections—good for three or six months before needing renewal—have proved popular. If sterilization—now the world's leading contraceptive method with an estimated 90 million couples thus protected[68]—and abortion were made easily and safely available in all developing countries, there could well be a substantial impact on birth rates. But these methods remain officially unacceptable in many areas and among some influential religious groups.

Information and education. Over the long run, population education can change family-size attitudes. In the short run, information about contraception, an integral part of most family planning programs, helps spur contraceptive acceptance. Some governments are going beyond this to emphasize the desirability of the two or three child family, and in China, one child.

Restructured development. This is the "message of Bucharest," that is, to push those elements of development that appear to be most directly related to lowered fertility: reductions in infant mortality, improvements in women's status, better education and nutrition, and generally more equitable distribution of the benefits of development. These are all desirable goals in themselves and indeed are already part of development planning in most LDCs.

Incentives/disincentives. Singapore, a pioneer in this approach, with housing, tax, and maternity policies designed to discourage more than two children per family, has now reduced its fertility to replacement level. Direct payments raised vasectomy acceptances dramatically in India in the early 1970s, but were later abused. Indonesia and other countries are now experimenting with community incentives—offering roads and water supplies, for example, to villages which achieve lowered fertility goals.

Pressures and sanctions. Some observers feel that voluntary family planning, even coupled with measurable gains in levels of living, cannot be expected to reduce LDC birth rates rapidly in the near future because most couples in developing countries, they claim, still *want* large families. Recent World Fertility Survey data do show ever-married women in developing countries reporting that they want one to nearly five more children than the average of about two desired children reported by their counterparts in Hungary and Japan, for example. Even in the U.S., however, desired family size averaged a relatively high 2.7 children among ever-married women aged 15-44 interviewed in the 1976 National Survey of Family Growth (Table 4). People concerned about the apparent gap in developing countries between desired family size and replacement-level fertility argue that closing the gap may take politically organized peer pressure, as in China. In some developing countries, they say, it may take stronger pressures and penalties such as those tried or proposed in India during the sterilization drive of 1976-77, although these backfired. Such measures appear unethical to many people in developed countries, although it is conceded that government restraints on individual freedom in the interest of the common good are accepted in other demographic areas such as age at marriage, international migration, and vaccination. To those who decry government pressure to reduce fertility, the proponents of this approach counter with arguments like

Table 4. Desired Family Size: World Fertility Survey Findings, 1974-1978

Country (year of survey)		Average number of children desired by ever-married women
Africa		
Kenya	(1977-78)	6.8
Asia and Pacific		
Bangladesh	(1976)	4.1
Fiji	(1974)	4.2
Indonesia	(1976)	4.2[a]
Malaysia	(1974)	4.4
Nepal	(1976)	3.9
Pakistan	(1975)	4.3
South Korea	(1974)	3.2
Sri Lanka	(1975)	3.8
Thailand	(1977)	3.7
Latin America		
Colombia	(1976)	4.1
Costa Rica	(1976)	4.7
Dominican Republic	(1975)	4.7
Mexico	(1976)	4.4
Panama	(1976)	4.2
Peru	(1977)	3.8
Developed countries		
Hungary	(1974)	2.0
Japan	(1974)	2.2
United States	(1976)	2.7

Sources: Kenya: Central Bureau of Statistics, *Kenya Fertility Survey: Major Highlights, 1977-78.* (Nairobi: Ministry of Economic Planning and Community Affairs, 1979); Hungary: Hungarian Central Statistical Office, *Main Results of the 1977 Hungarian Fertility, Family Planning, and Birth Control Study, TCS-77* (Budapest, 1978); United States: unpublished data from 1976 National Survey of Family Growth supplied by William F. Pratt, Chief, Family Growth Survey Branch, National Center for Health Statistics. Results from this U.S. survey are to be published within the World Fertility Survey (WFS) series. All other data in this table are from published First Country Reports or Summary Reports of the WFS.

[a] Currently married women.

those of demographer Kingsley Davis at the 1978 hearings of the U.S. House of Representatives Select Committee on Population:

> "It is patently misleading to believe that fertility can be reduced to replacement levels with no restraints whatsoever by way of incentives and/or disincentives for individual behavior. . . . To endorse absolute voluntarism when it comes to having children is to deny the reality of the harsh consequences on human well-being of high rates of population growth and therefore is neither ethical nor humanitarian."[69]

Although the emphasis may vary with individual country situations, all of these approaches are and will doubtless be necessary if fertility is to decline rapidly to replacement level in the coming two or three decades. The only other alternative to staving off an intolerable ultimate global population size is higher death rates and that choice is unacceptable. Migration to industrial countries has eased population pressure for some small and medium-size developing countries—Algeria, Mexico, Morocco, Tunisia, and Turkey, for example. But international migration on the scale that would be required to make a significant difference for countries the size of India and Pakistan is now impossible. India alone adds 13 million to the world's population every year—the same number currently estimated for the refugees that are now straining the entire free world's absorptive capacities.[70]

The growing awareness of the world's population problem over the past ten to 15 years is encouraging as is the recent slowdown in global growth rates. But in absolute numbers the population explosion forecast by Population Reference Bureau founder Guy Irving Burch is with us more relentlessly than ever. In the 50 years since Burch founded the Bureau, world population has more than doubled. If the current growth rate were to continue, the next doubling would take 41 years. In the eight and a half years since "Man's Population Predicament," the predecessor to this *Bulletin*, was published, the earth has added 640 million people—nearly three more United States. The "new look" at the predicament reported here indicates that worldwide action to unravel the predicament is needed more urgently than ever.

Slowing and eventually halting population growth will not alone solve all of humanity's most pressing problems. Lifestyles will also have to change in the rich developed world and among the affluent elite of developing countries if the absolute poverty of what the World Bank estimates to be 800 million human beings in the developing world is to be relieved; all the world's people adequately fed; North-South tensions eased; energy shortages and attendant inflation and unemployment overcome; and the global environment preserved. But rapid population growth shares the roots of these problems with growing consumption rates, and reducing it is essential to their solution.

The world is already overcrowded at 4.3 billion—in both developed and developing countries—and is destined to become much more crowded. We can no longer avoid a world of at least 6 billion and then, probably, some decades later, 8 billion. But the actions we take now could—and must—avert the even greater stresses, poverty, and hunger that would prevail in a world of 10, 11, or more billions.

Photo by Harold M. Lambert

The Age of Discontinuity

By **Rufus E. Miles, Jr.**

Rufus Miles served as PRB's President and Editor from May 1970 to September 1971, after having been a Member and then Chairman of the Board of Trustees since 1957. Capping a long and distinguished career with the federal government, he was the senior administrative official of the Department of Health, Education, and Welfare from 1953 to 1965. From 1966 to 1970 he was director of the Mid-Career Program for federal officials at Princeton University's Woodrow Wilson School of Public and International Affairs. Currently, he is a Senior Fellow at the Woodrow Wilson School.

Long concerned with subjects of demographic consequence, Mr. Miles authored several outstanding Population Bulletins, *including "Population Challenge of the '70s" (February 1970) and "The Future Population of the United States" (February 1971), in addition to the predecessor to this* Bulletin, *"Man's Population Predicament" (April 1971). He is also the author of* Awakening from the American Dream *(Universe, 1976).*

The age in which we live has been properly characterized as "the age of discontinuity." Each year it becomes more apparent that the trends of recent decades—in population, energy consumption, and economic growth—are subject to downward shifts that are more abrupt than any that were thought likely a decade or two ago. Projections based on extrapolations of past trends until the end of the century have often turned out to be much in error, almost always on the high side. Projections for several decades beyond the year 2000 based on similar extrapolations, even with moderate downward adjustments, seem even more likely to require marked reduction as the years go by. There seems little doubt that the world is in for a dramatic set of changes in the most fundamental factors influencing the growth of national societies.

American demographers were confounded after World War II by the amazing increase in fertility that became known as the "baby boom," and by its rather abrupt end and conversion into a "baby bust." Fertility dropped in 16 years to a mere half of what it was in 1957, bringing it down so low that by 1973 American women were no longer replacing themselves. The change was so rapid that the Census Bureau's 1956 "low projections" for 1975 became the "high projections" for 1981. Apart from immigration, the population of the U.S. now seems likely to start declining after the children of the baby boom have completed their families.

Sub-replacement fertility is now becoming the norm in the developed world. Many European countries have lower fertility rates than the U.S. and at least two have already reached the point where their populations are declining. This situation was not foreseen two decades ago when most demographers assumed continuing growth in all countries for at least the rest of the century.

Current medium projections of the United Nations, based on extrapolations of recent trends, put global population at the end of this century at 6.2 billion and ultimate world population (around 2125) at about 11 billion when births and deaths are expected to come into balance. Whether U.N. demographers expect world population to stay at this level after that is not clear. But dramatic changes, already emerging, may cause the United Nations to find itself in the same situation as the Bureau of the Census in the 1960s when it had to issue downward adjustments at frequent intervals because of the rapidly changing mores of American women. This is already foreseeable as a result of the demographic earthquake that seems to be occurring in China.

China's attack on population growth

As highlighted earlier in this *Bulletin*, Deputy Prime Minister Chen Muhua announced in August, 1979, that China had succeeded in reducing its annual rate of natural increase from 2.3 percent in 1971 to 1.2 percent in 1978. Thus, China, although still overwhelmingly rural and agricultural, is moving surprisingly rapidly toward the pattern of low birth and death rates characteristic of industrialized and urbanized nations. Not content with its progress so far, China has decided to mount a strenuous campaign to persuade married couples to limit their families to one child and to reduce population growth to 0.5 percent by 1985 and zero in the year 2000. Such a rapid reduction in the rate of population growth would appear to be unobtainable, but the very magnitude of China's effort to halt its population growth is indicative of a profound and sudden change in the reproductive mores of more than one-fifth of the human race.

The psychological impact of China's remarkable slowdown in population growth may well result in a significant change in official attitudes and policies in many of the developing nations. Until quite recently, the Marxian doctrine that population growth could never be a problem in a well-organized Marxist state was the guiding dogma of China and almost certainly had significant influence on other nations of the developing world. Now that doctrine has been jettisoned by the world's largest nation, presumably on the ground that it has been proven invalid. If it is invalid for China, and if China makes a concerted and continuing effort to reduce fertility to sub-replacement levels, the example can hardly fail to have effect elsewhere.

It can hardly be expected, however, that other developing nations will be able to achieve such rapid birth rate reductions as China has. The levels of education and social discipline in China are higher than in almost all nations that now have high rates of population growth. Moreover, it seems unlikely that even China will long pursue the one-child family goal, since the distortion of the age distribution would become extreme. China would face the unhappy prospect of a very small generation of workers supporting a huge group of oldsters. Nevertheless, China's turnabout in family planning policy now makes it seem likely that the U.N. projection of an ultimate world population of about 11 billion early in the 22nd century will be revised downward in the not distant future.

Photo by Jessie Harris

Boys at the Ming Tombs in Peking. China's drive for a drastic slowdown in population growth could reduce current projections of the world's ultimate stabilized population size.

Does this mean that the prospect of famine, severe malnutrition, and other manifestations of dire poverty will be correspondingly reduced? In some degree, perhaps, but the radically changed energy picture makes it even more urgent that birth rates be sharply reduced in the developing world. The brevity of the era of plentiful and cheap petroleum and natural gas—the second major manifestation of the age of discontinuity—has been gradually sinking into the consciousness of the American people and the rest of the world. The ending of this era will clearly make it much more difficult to lift the living standards of the billions of people in the developing world who are still increasing in number by more than 2 percent a year.

End of the petroleum era

Until the early 1970s, Americans could see no near-term limit to the productivity of their oil or gas wells. The U.S. Geological Survey was estimating ultimate petroleum reserves in the "lower" 48 states of 500-600 billion barrels, enough to last for many decades even assuming a considerable growth in consumption. A lone geologist and geophysicist, Dr. M. King Hubbert, then working for the Shell Oil Company in Houston, Texas, had predicted as early as 1956 that oil "production" (the proper world should be extraction, but it is never used) in the lower 48 states would peak near the end of the 1960s and thereafter begin to decline at an accelerating pace, but nobody paid attention. The peak actually did occur in 1970, but the U.S. Geological Survey was still euphoric about the prospect of great new oil discoveries. It regarded Hubbert's estimate of roughly 165 billion barrels as a gross underestimate of U.S. oil reserves in the lower 48 states. In the nine years since the decline set in, however, Hubbert has become something of a minor prophet and the U.S. Geological Survey has had to reduce its estimates by more than half. (It is worthy of note that Hubbert served as a trustee of the Population Reference Bureau from 1966 to 1972.)

Hubbert based his estimate of U.S. oil reserves (excluding Alaska), and his prediction as to when the peak of production would be reached, on the cassic bell curve. With it, he estimated that the U.S. would consume the middle 80 percent of its total oil deposits of liquid petroleum (outside Alaska) in the 65-year period from 1934 to 1999. He used the same methodology in respect to world oil supplies and concluded, on the basis of somewhat less reliable data, that the middle 80 percent of the world's oil would be consumed in 58 years from 1965 to 2023, with the peak of production being reached between 1990 and 2000.

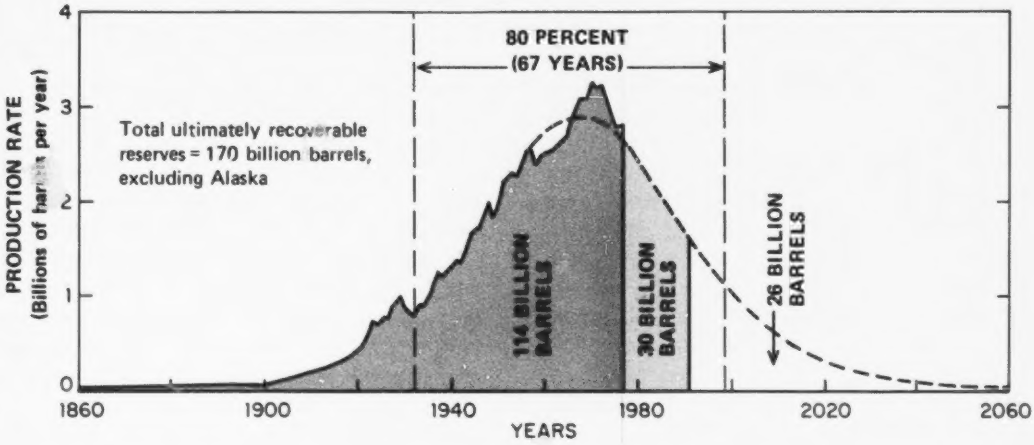
Hubbert has since revised these estimates slightly. For the U.S., based on data to 1979, he increases his estimate of the ultimately recoverable crude oil reserves for the lower 48 U.S. states to 170 billion barrels with the time frame for production of the middle 80 percent extended to 67 years, 1932 to 1999 (Figure 14). Adding in Alaska oil reserves of about 35 billion barrels increases the U.S. total to 215 billion barrels but extends the time frame for only a few more years. For the world as a whole, Hubbert suggests that, for political and other reasons, oil production might stagnate at the current 20 billion barrels per year. If that were to happen, the "middle-80-percent-production" span could be extended to 2056.[71]

In all cases, and even allowing for a fair margin of error, the brevity of the petroleum era is self evident.

One remarkable feature of the petroleum era has been the extraordinary cheapness of energy derived from oil and the consequent speed with which American civilization has structured itself on the assumption that petroleum and its derivatives would always be cheap and plentiful. Even so recently as the beginning of World War II, the man-built features of the U.S. were astonishingly different from what they are today. Cities had no freeways, no circumferential highways, no supermarket shopping centers, few suburbs that were not reachable by mass transit, few commercial airplanes and airports, and an abundance of electric streetcars and railroad passenger trains. Over 43 percent of the people lived in rural areas. In the 39 years since 1940, the country has so completely restructured itself that a person who cannot afford an automobile, or would prefer to live without one, is more of a social cripple in most parts of the U.S. than a paraplegic with a specially fitted automobile. Our society has built itself on the assumption of the universal use of the automobile and the continued availability of cheap gasoline. What will happen to this society when the supply of oil falls further and further

Figure 14. Complete Cycle of U.S. Crude Oil Production: King Hubbert Estimate, 1979

(excluding Alaska)



Source: M. King Hubbert, Consultant, Washington, D.C. 20016, unpublished updated estimate, 1979.

behind the demand? This question will lie at, or close to, the center of American consciousness for the rest of the century.

Hard as it will be for most Americans to learn to readjust to the approaching end of the era of cheap petroleum, its impact on the developing nations will be harder still, and by a substantial margin. They had counted on being able to increase their purchases of oil to help them not only to industrialize but also to increase their agricultural productivity. Those that lack exportable resources or products with which to purchase high-priced oil, and lack the capacity to purchase capital equipment that would enable them to compete in international markets, will find it increasingly difficult to maintain existing levels of living for populations growing at 2 to 3 percent a year, let alone improving their diets and other elements of an increased level of living. The problem is further compounded by the severe maldistribution of wealth and income within many of these countries. The energy problem is clearly making the population problem more acute.

Unfortunately, as the price of energy goes up and as the American consumer finds himself in a tighter and tighter price squeeze, foreign aid to the less fortunate nations seems likely to have low priority within the nation's budget. Cries for a more equitable economic order for the world will probably fall on deaf ears among the voters and the Congress. Conceivably, other international cartels than OPEC (Organization of Petroleum Exporting Countries) might succeed for a time in raising the prices of raw materials or agricultural exports of nations that join together to form a cartel, but the prospects of success seem dim. In these cases, unlike oil, other materials and products can usually be substituted rather rapidly if prices are boosted too high. In the end, hard and unjust as it may seem to the developing nations, most of them are going to have to rely primarily on indigenous solutions to their race between population and resources.

Among the options open to them is the adoption of nationwide programs of education, incentives, and strong encouragement toward small families on a much more concerted basis than those conducted by most of them so far. Failure to proceed in this manner seems likely to result in more severe malnutrition than already exists, and will almost certainly bring on periodic famines in various countries. The oil crisis should bring one nation after another to a realization that there is no escaping the need to bring births and deaths into balance at the earliest possible date. The realization of the human population predicament and effective action to cope with it by the developing world may change reproductive mores more rapidly in the 1980s than most demographers have heretofore thought at all likely.

Within such a world context, Americans are faced with the moral imperative and the practical necessity to reduce rapidly their profligate consumption of the remaining reserves of the world's precious petroleum. A concerted and continuing program of oil conservation will be of more value in the long run to the developing countries of the world than billions of dollars in foreign aid. Simultaneously, it will curb inflation and improve national security. And it may well stave off or reduce the severity of future famines in parts of the developing world.

Barring a nuclear holocaust, the children of the baby boom, who also happen to be the children of the petroleum binge, should live to see the end of the population explosion. They will live to see the extent to which human beings and human societies are able to use their allegedly superior intelligence to adjust to a very different world than one of unending growth. It will be a supreme test of human wisdom. □

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Population Bulletin

Europe's Fertility Transition:

New Evidence and Lessons for Today's Developing World

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Abstract—This *Bulletin* describes the methods, findings, and implications of recent research which yields a clearer picture of Europe's historical transition from high to low fertility than was available just a decade ago. New measures have been devised for use in family reconstitution studies based largely on church registers of baptisms, marriages, and burials, and in macro-level studies based on published censuses and vital statistics for such geopolitical units as provinces. Written records left by contemporaries provide a third source of new information. Findings show that Europe's long-term fertility decline resulted from the shift from natural fertility to family limitation within marriage which was previously rare although a substantial portion of births may have been unwanted. High infant and child mortality in the pretransition period may have been partly the result of high fertility rather than the other way round. The start of Europe's fertility decline occurred under a wide variety of socioeconomic and demographic conditions, followed cultural and linguistic lines, and was highly concentrated between 1880 and 1910. Once under way, the increased practice of family limitation and decline in marital fertility were essentially irreversible processes. Similar features can be identified in many less developed countries today, although, where begun, the fertility transition there is occurring far faster than it did in Europe. The authors conclude that, contrary to the currently popular view derived from older impressions of Western Europe's fertility transition that "Development is the best contraceptive," the new evidence suggests that "in many cases a greater payoff [in hastening fertility decline in developing countries] might well result from concentrating efforts on improving and extending existing family planning programs."

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Europe's Fertility Transition:
New Evidence and Lessons for Today's Developing World

By Etienne van de Walle and John Knodel

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Vol. 34, No. 6, February 1980

Knodel family album

A large German family before the fertility transition.

Europe's Fertility Transition:

New Evidence and Lessons for Today's Developing World

By **Etienne van de Walle**
University of Pennsylvania
and
John Knodel
University of Michigan

Etienne van de Walle holds doctorates in both law and demography from the University of Louvain, Belgium. Currently, he is Professor of Demography and Director of the Population Studies Center, University of Pennsylvania. His publications in historical demography include The Female Population of France in the Nineteenth Century *(Princeton University Press, 1974) and over 30 journal articles and book chapters. He has also published widely on African demography, including the well known book,* The Demography of Tropical Africa *(with William Brass and others, 1958).*

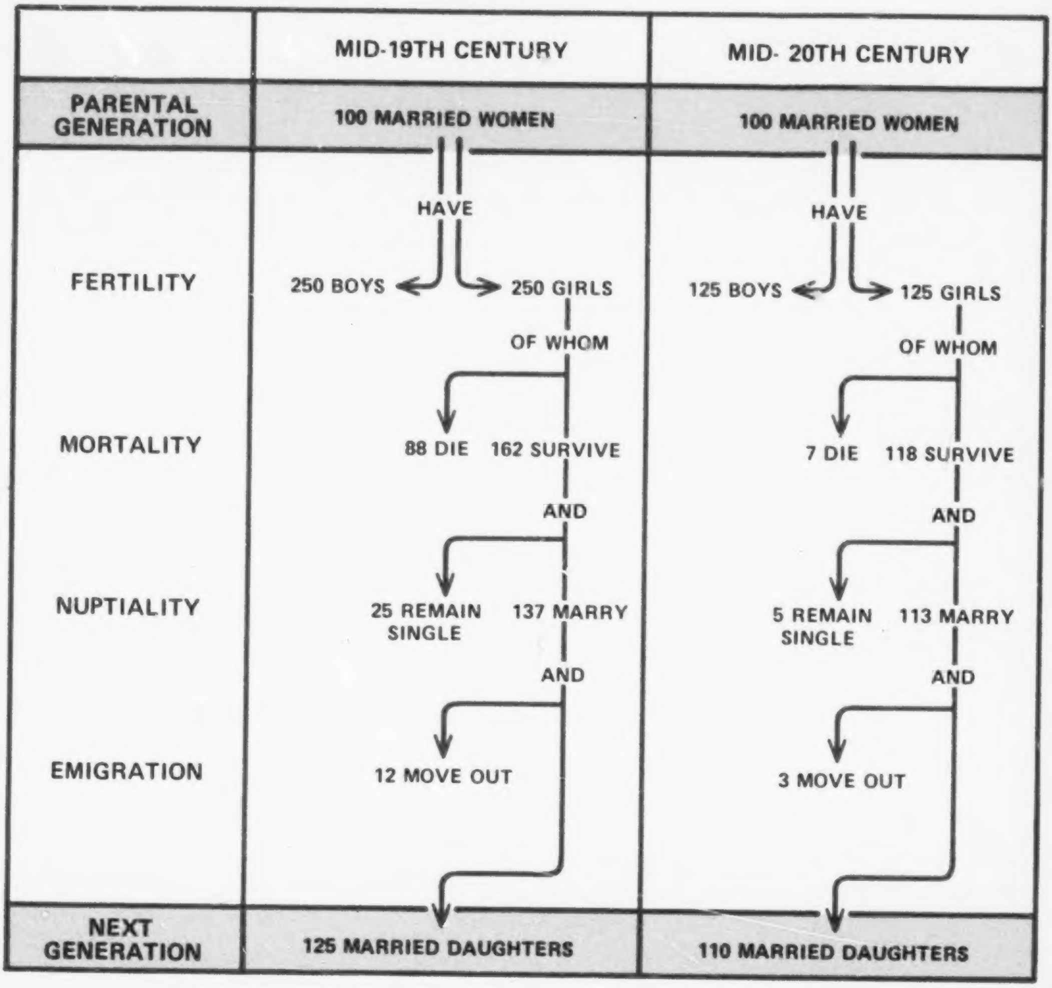
John Knodel holds the Ph.D. in sociology from Princeton University and is currently Associate Professor, Department of Sociology, and Research Associate, Population Studies Center, University of Michigan. In the area of historical demography, he has authored some 30 journal articles and book chapters and the monograph, The Decline of Fertility in Germany, 1871-1939 *(Princeton University Press, 1974). He has also produced numerous works on the population of Thailand, having served several periods as Resident Advisor and Consultant to the Institute of Population Studies, Chulalongkorn University, Bangkok.*

Parts of this Bulletin *draw on the authors' earlier article, "Lessons from the Past: Policy Implications of Historical Fertility Studies,"* Population and Development Review, *Vol. 5, No. 2 (June 1979). The authors extend special thanks to Sara Millman and Francine van de Walle for help in preparing figures and tables. Research on which this* Bulletin *is based was supported in part by a Rockefeller Foundation research fellowship awarded to John Knodel.*

In most countries of the West 100 years ago, women could expect to bear six to eight children, if they married in their early twenties and survived with their husbands until the end of their reproductive years, as is usual today. Four to six of these children would survive to a marriageable age themselves. Actually, the average married woman had considerably fewer births since most women married rather late and some died or were widowed before the end of the childbearing span. And not everyone would marry. In Western European countries, a tenth to a quarter of all women remained single compared to well under a tenth today, on the average. Most of us, if we were to go back a few generations in our genealogies, would find large families, and then progressively smaller ones as we get closer to the present, probably within the past two or three generations. This shift is so recent that many of us can follow it in faded family photographs of the past century. First, there are those of parents surrounded by large broods, ordered by size, with the lastborn in the arms of the mother, and photos of bachelor uncles and spinster aunts; and then, after one or two transitional generations, the snapshots of our own type of families with two or three children.

The change can be illustrated by looking at what would typically have happened to the children born to 100 women married in the middle of the 19th century, in contrast with a corresponding group at mid-20th century. This comparison is presented in Figure 1 (next page) and is intended to be illustrative of Western Europe. The situation would be somewhat different for the U.S. where marriage was not as late in the

Figure 1. Typical Demographic Patterns in Western Europe: Mid-19th and Mid-20th Centuries


MID-19TH CENTURY
MID- 20TH CENTURY
PARENTAL GENERATION
100 MARRIED WOMEN
100 MARRIED WOMEN
HAVE
HAVE
FERTILITY
250 BOYS
250 GIRLS
125 BOYS
125 GIRLS
OF WHOM
OF WHOM
MORTALITY
88 DIE
162 SURVIVE
7 DIE
118 SURVIVE
AND
AND
NUPTIALITY
25 REMAIN SINGLE
137 MARRY
5 REMAIN SINGLE
113 MARRY
AND
AND
EMIGRATION
12 MOVE OUT
3 MOVE OUT
NEXT GENERATION
125 MARRIED DAUGHTERS
110 MARRIED DAUGHTERS

19th century and not quite so many women remained permanently single.

Much of 19th century Europe's high fertility was neutralized by high mortality. The prevailing patterns of delayed marriage and lifetime celibacy assisted in the process. In our illustration, late marriage and premature widowhood account for the fact that 19th century mothers had only five children on the average, well below the potential (left panel, Figure 1). Because of celibacy, 25 of the 162 daughters who survived to the age of childbearing did not contribute to the next generation and emigration accounts for the loss of an additional 12. For the U.S. or other countries which received Europe immigrants, there would have been a net gain of females who might themselves bear children. Comparing the 100 married women at the start with the 125 at the outcome shows that substantial population growth could occur, despite fairly high levels of mortality, non-marriage, and international migration.

The mid-20th century pattern of Western Europe appears on the right side of Figure 1. A substantial decline in fertility makes for fewer children per family but their chances of surviving to the age of childbearing are close to 95 percent. Relatively more of the surviving daughters are likely to marry (and fewer will emigrate). The net result is a 10 percent gain in population over a generation compared to a 25 percent gain a century ago.

This shift from high to low fertility and from high to low mortality is called the demographic transition. It is one of the most influential social transformations of modern times. Because it was accompanied by a wide range of social changes, it would be difficult to imagine the world of today with the families of yesteryears. People who live in modern apartments, benefit from a wide range of consumer goods, have access to the media, and enjoy the benefits (and pay the cost) of advanced medicine, public health, and education do not have large families as a rule. The logic of the small family, so prevalent today, was probably as foreign to our ancestors as their reproductive behavior seems to us.

Seen from the perspective of an entire society, the transformation was characterized by a drastic change in birth and death rates. In the first half of the 19th century, there were two general levels of birth rates in Europe. West of an imaginary line running from the Adriatic to the Baltic Sea, birth rates were under 40 per 1,000 persons per year—the result of late marriage and widespread celibacy—and death rates were in the 20s. East of the line, universal and early marriage made for birth rates above 40 per 1,000—not unlike those in much of Asia and Africa today—while death rates were in the 30s. Now, at the end of the transition, most birth rates are under 15 per 1,000 population in Western Europe and only a little higher in Eastern Europe. And death rates on both sides of the line are down to about 10 per 1,000.

Traditional views of fertility decline

The momentous shift from high to low birth and death rates has intrigued social scientists since it first became evident. Based on what seemed to be the experience in Western Europe, a general "theory of the demographic transition" was developed. This theory holds that fertility decline—the focus of this *Bulletin*—follows only after, and as the result of, a decline in mortality (particularly infant mortality) and an improvement in social and economic conditions or "modernization." This view has been presented to policymakers as a prescription for hastening fertility declines in today's developing countries.

It was pointed out that the shift from high to low birth rates was accompanied by broad developmental changes that transformed the West from a rural-agrarian to an urban-industrial society. Also in the world today, generally speaking, birth rates are low in the developed countries and high in developing countries. Much of Europe's fertility decline took place before modern contraceptives or safe medical abortion were readily available, and thus, it is argued, couples who limited their family size must have done so through withdrawal or abstinence, that is, through methods theoretically available to everyone. If abortion was important—as it evidently was in certain countries by the beginning of the 20th century—it was such a dangerous procedure that women probably resorted to it only in cases of extreme need, and mostly outside of wedlock.

Such impressions of the European experience, together with the differences in fertility apparent today between the developed and developing countries, have been used as evidence to support arguments that organized family planning programs are unlikely to contribute much to the precipitation or acceleration of fertility declines in the developing world. Poor, rural people have large families because they want them, it is claimed, or because they feel many births are needed to compensate for high infant and child mortality. As countries become urbanized and industrialized, people educated, and infant mortality lowered, couples will naturally be motivated to reduce family size. Modern birth control methods are hardly necessary for fertility to decline, it is alleged. "There is ample historical evidence . . . that fertility can be greatly reduced without access to modern contraception. There is no reason to assume that the same thing would not happen anywhere in the contemporary world if that is what people really wanted."[1] This widely accepted argument was summed up in the rallying cry of many developing country delegates to the 1974 World Population Conference in Bucharest: "Development is the best contraceptive."

Since the past is our only laboratory, it is important that lessons for today's developing world drawn from Europe's historical experience should be based on what actually took place. The popular interpretation of Europe's fertility decline has stemmed from a combination of hazy empirical impressions and theoretical preconceptions. Now the record has been examined more closely. Using new sources of information and new analytical methods, historical demographers have recently been able to develop a much more detailed picture of Europe's fertility decline than was available just a decade ago. This new evidence shows that sustained fertility declines in Europe began under a much wider variety of social, economic, and demographic conditions than was previously thought and seemed to follow cultural and linguistic lines; that they were remarkably concentrated as to the time when they started—mostly between about 1880 and 1910; and were irreversible processes once under way. It also shows that large families were not necessarily desired in pretransition Europe; that high infant and child mortality may have actually been partly the result of high fertility rather than the other way round; and that the available fertility control methods—withdrawal, abstinence, and abortion—may not have been used because they were unthinkable for married couples, ineffective, or even simply unknown.

We open this *Bulletin* with a description of the new sources of information and of the refined concepts and measures developed during the recent research and the new picture they reveal of Europe's fertility transition. The evidence is interpreted and we then attempt to draw more accurate lessons from the historical experience for policy in today's developing countries—in many of which the fertility transition has now begun.

Most of the evidence presented here is based on the European (and especially Western European) experience. Historical studies are also emerging for North America, Japan, and other now developed areas, but the research for Europe is more extensive and we are more familiar with it. We also deal mainly with the fertility of married couples. This leaves out of account the important difference between Western Europe's historical marriage patterns and those in developing countries today, as well as non-Western European countries in the past. Western European populations during at least the 17th through the 19th centuries tended to marry later and higher proportions remained permanently single than was true in the U.S. or Eastern Europe at the time, and certainly by comparison with most developing-world populations today. This kept birth rates in preindustrial Western Europe below the levels still typical in many developing countries. Although this adds somewhat to the problems of extrapolating from Europe's historical experience to the current situation in the developing world, we feel the particular lessons we draw remain nonetheless applicable.

New Information Sources

The West has been a record-keeping civilization, particularly with respect to matters related to population. Thus it is possible to study today the changes in human behavior which touched off the fertility transition a century or two in the past. Two quite different types of demographic studies, based in turn on different sources of data, have been largely responsible for the recent expansion in our knowledge of historical trends.

Macro-level studies

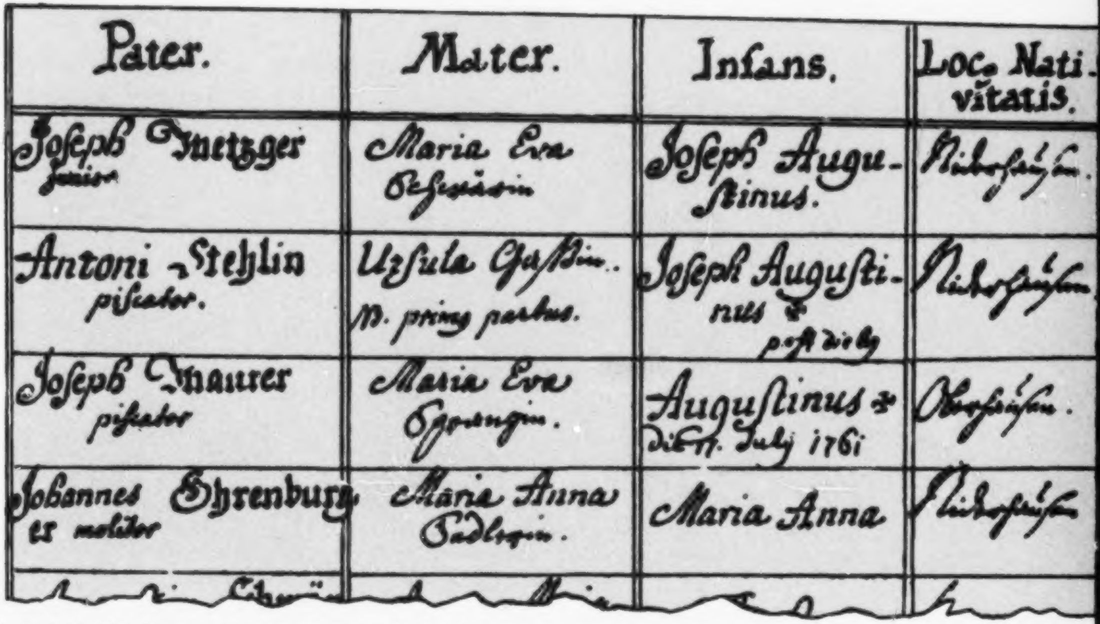
The first kind of study is based on conventional demographic sources, the published censuses and reports on births and deaths issued regularly by national and state statistical offices. Since these reports refer to whole populations of administratively defined geopolitical units such as nations or provinces, studies based on them are labeled macro-level. Among the best known of such studies is the European Fertility Project undertaken by staff and associates of the Office of Population Research at Princeton University under the direction of Professor Ansley Coale. Its aim has been to study the long-term decline in fertility since its beginning a century or more ago in the 700 province-size administrative units of Europe. As a result, considerable information has been unearthed on demographic trends at the provincial level and on the general socioeconomic context in which they occurred.[2]

Censuses have been around for a long time in some Western countries. The oldest to survive for an entire state, a *catasto* of Tuscany, dates back to 1427.[3] New France (present-day Quebec) was the first country to conduct successive national censuses, beginning in 1665.[4] In the U.S., a national census first took place in 1790 and has been repeated at ten-year intervals ever since. However, it was really not until the latter half of the 19th century that most Western countries instituted systematic enumerations of their entire populations and published the results in sufficient detail to be of value for demographic research. Similarly, "civil" registration of births and deaths was not entirely absent in earlier centuries, but did not become systematic in most Western countries until the 19th century. Fortunately, this time limitation on the data available for macro-level studies of the demographic transition is less of a problem that it might at first seem, since in many Western countries the sustained decline in fertility also did not begin until the end of the 19th century.

Micro-level studies

Although macro-level studies have advanced our knowledge of the West's fertility transition, they can shed little light on the situation prior to or at the very early stages of the fertility decline, particularly in areas where the decline began unusually early. Moreover, a number of questions related to the fertility transition can best be addressed with data on individuals rather than on aggregate populations as is the case with published census and vital statistics reports. Fortunately, census lists of names and vital registration records can often still be used individually. And most Western nations possess another valuable source of demographic data, the local parish registers of baptisms, weddings, and burials kept by Catholic and Protestant clergymen, which often extend in continuous series as far back as the 17th century and even the 16th century in some cases. Parish and civil registers have served as the basic data sources for micro-level "family reconstitution" studies which have now extended our knowledge of reproductive behavior back to long before the general

Figure 2. Parish Baptismal Register: Germany, 1760



Pater.	Mater.	Infans.	Loc. Nativitatis.
Joseph Metzger junior	Maria Eva [illegible]	Joseph Augustinus.	[illegible]
Antoni Stehlin piscator.	Ursula [illegible] N. primus partus.	Joseph Augustinus & post [illegible]	[illegible]
Joseph Maurer piscator	Maria Eva [illegible].	Augustinus & die 11. Julij 1761	[illegible].
Johannes Ehrenburger molitor	Maria Anna [illegible].	Maria Anna	[illegible]

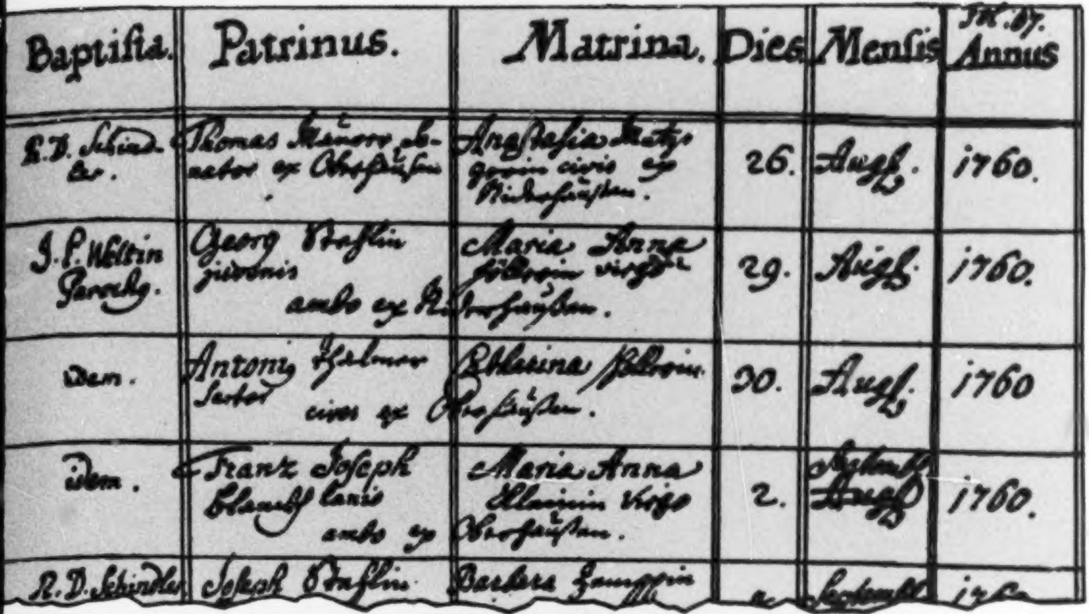
A page section from the baptismal register of 1760 for the parishes of Ober- and Niederhausen in Southwest Germany. The Latin column headings indicate, from left to right, names of the father, mother, and infant, place of birth, the priest who performed the baptism, godfather, godmother, and day, month, and year of the baptism. All entries are in Latin and handwritten in old style German.

sustained decline in fertility. Another source of data for such studies are existing geneaologies of sub-groups, particularly social elites, often compiled in turn from parish registers.

Unlike census and civil registration reports, parish registers are typically unpublished and available only in handwritten form at the local church. Although intended to record baptisms, weddings, and burials for ecclesiastical purposes, they serve as excellent records of births, marriages, and deaths. In some cases, the baptismal registers record even stillborn infants or those who died too soon for baptism. An example of an unusually good baptismal register is shown in Figure 2.

Because parish registers refer to identifiable individuals, it is possible to apply to them the technique of family reconstitution which links the birth, marriage, and death dates of each married couple and their children into a chronology of vital events. (See Table 1 for an example of a typical reconstituted family history.) This greatly expands the scope for research since many important demographic variables, such as birth intervals, family size, people's age at marriage, age of mother at each birth, infant mortality, and marital fertility can be readily calculated from such data.

Micro-level family reconstitution is tedious and time-consuming. Nevertheless, since the technique and the methodology to analyze the resultant data were introduced by French demographers just two decades ago, scholars elsewhere have been quick to follow their lead. By now, a large number of such studies are available for many Western countries, although they cover, even in France, only a miniscule proportion of the population, usually in villages. Rather like sample surveys today which



Baptiſta.	Patrinus.	Matrina.	Dies	Menſis	Annus
R.D. Schindler.	Thomas [illegible] senator ex Oberhausen	Anastasia [illegible] civis ex Niederhausen.	26.	Aug.	1760.
J.P. Weltin Parochus.	Georg Stehlin juvenis ambo ex Niederhausen.	Maria Anna [illegible] virgo	29.	Aug.	1760.
idem.	Antoni [illegible] Sartor civis ex Oberhausen.	Catharina [illegible]	30.	Aug.	1760
idem.	Franz Joseph [illegible] ambo ex Oberhausen.	Maria Anna [illegible] virgo	2.	[illegible] Aug.	1760.
R.D. Schindler	Joseph Stehlin	Barbara [illegible]	[illegible]	[illegible]	[illegible]

Source: Albert Köbele and Margarette Kirner, *Ortssipenbuch Rheinhausen*: Selbstverlag des Herausgebers, Grafenhausen, 1975.

ask individual respondents about desired family size and their knowledge, attitudes toward, and practice of contraception, family reconstitution studies can shed light on individual motivations for and use of fertility control which is unavailable from the aggregate statistics on "achieved" fertility drawn from public records. With the help of various indirect techniques, described in the next section, family reconstitution data have revealed a surprising amount about behavior and contraceptive practice in years gone by. Historical demographer Peter Laslett comments:

"It is an extraordinary thing that we can investigate these, the most intimate, doings of our predecessors and discuss them with some confidence, whilst many of their more public actions and attributes are still mysterious and will probably remain so. When we analyse what happened between man and woman lying together in the little parlours of

Table 1. Reconstituted Family History: Germany, 18th Century

Married 24/9/1759
Antoni Stehlin, Fisherman
born 22/6/1730, died 17/11/1784
and
Ursula Gass
born 20/10/1726, died 10/11/1770

Children

1. Joseph Augustinus, born 29/8/1760, died 29/8/1760
2. Joseph, born 4/4/1762, died 16/8/1770
3. Anna Maria, born 10/2/1764, died 10/5/1776
4. Elizabeth, born 18/11/1766, married 28/2/1791, died 6/1/1814

A reconstituted family history from the parish of Niederhausen. The firstborn child is the second entry in the baptismal register page section shown in Figure 2.

Source: Köbele and Kirner (see Figure 2) their cottages, for the parlour was the bedroom before the ordinary man's house acquired an upstairs, we are in fact observing the purchase over what they allowed themselves to do of a whole social system."[5]

Contemporaries' views

In addition to the contributions made by studies at the macro level and micro level, both of which provide extensive quantitative evidence, our understanding of reproductive behavior in the past is also being increased by a third, very different, group of studies that are largely qualitative in nature. These studies stem more out of the tradition of social history than of demography and are often based on literary evidence, including letters and novels of the time. They also draw on reports by trained, contemporary observers—19th century statisticans interpreting their data in the introductions to official publications, for example, or county and small-town doctors reporting on their patients and striking local health conditions. Taken with appropriate caution, such sources can tell much about knowledge of birth control and attitudes toward reproduction and children in the past and help place the newly emerging quantitative findings in their social, psychological, and cultural context.

Refined Concepts, New Measures

In their study of the historical decline in Western fertility, researchers have refined the conceptualization of the basic demographic processes involved and developed new ways to measure them on the basis of the available data. These refined concepts and new measures are an important contribution of the increased research effort of the past two decades and, when combined with the substantive findings, add considerably to our understanding of the behavior changes that underlie the fertility transition.

Natural fertility and family limitation

One of the most fundamental distinctions to emerge is that between natural fertility and family limitation. Introduced by French demographer Louis Henry about two decades ago,[6] the concept of natural fertility refers to situations where couples do not attempt to terminate childbearing before the end of the biological reproductive span. In other words, couples do not aim for a desired family size and thus make no effort not to exceed a certain number once it is reached. Indeed, under conditions of natural fertility, the very idea of wanting two, three, or any specific number of children may be quite foreign. As we shall see, natural fertility is characteristic of most populations prior to the long-term decline of fertility.

Family limitation refers to the opposite situation where couples make a deliberate effort to terminate childbearing once they have reached some particular number of children which they feel is sufficient, whatever that number may be. It is important to note that family limitation is not synonymous with "birth control." Family limitation depends on the number of children already born and refers specifically to behavior designed to stop childbearing altogether. The term birth control, on the other hand, encompasses both behavior intended to stop births and deliberate attempts to space births, and may also apply to behavior outside of the family context, that is, in illegitimate relations. Birth spacing is not inconsistent with family limitation. However, situations where couples deliberately attempt to space births but are unconcerned with the ultimate number of children (as is common in Sub-Saharan Africa today) are classified as natural fertility rather than family limitation. This distinction is useful because the techniques that have been developed to study historical data can detect stopping behavior but not deliberate birth spacing. The distinction is also theoretically important since it appears that it was the introduction and spread of stopping behavior (and not spacing) that was the key feature in the onset of the fertility transition. In brief, the long-term decline of fertility resulted from the shift from natural fertility to family limitation.

Where natural fertility prevails, couples continue childbearing until they are physiologically unable to have more children. This usually depends on the wife since men are able to father children to considerably older ages than those at which women become incapable of conceiving and giving birth. With no controls on fertility, the age at which women bear their last child in populations that are still in the pre-fertility-decline stage is quite late. This is demonstrated in the results from the family reconstitution studies summarized in Table 2 for couples married before the onset of the fertility transition. The age at which these women bore their last child is remarkably similar across these rather diverse regions of France and Germany, and averaged close to 40. While it is not unknown for women to bear children in their late forties, an *average* age of around 40 seems a reasonable approximation of the maximum age at which any sizable population of women could continue childbearing. Women's average age at menopause is probably closer to 50 but medical and biostatistical evidence indicates that the ability to conceive and bear a live child declines substantially prior to menopause.[7]

Table 2. Wife's Average Age at Last Birth in Pretransition Societies

(Family reconstitution studies of French and German villages)

Location	Number of studies/ villages[a]	Wife's average age at last birth[b]
French couples married in the 17th and 18th centuries		
South and central France	4	39.3
Paris region and north France	4	40.4
Northwest France	7	40.4
Northeast France	3	39.8
German couples married before 1850		
Southwest Germany	5	39.9
Bavaria	3	40.6
Hesse	4	40.7
East Friesland	2	39.6

Sources: Daniel S. Smith, "A Homeostatic Demographic Regime: Patterns in West European Reconstitution Studies," in Ronald D. Lee (Ed.), *Population Patterns in the Past* (New York: Academic Press, 1977); John Knodel, "Natural Fertility in Pre-industrial Germany," *Population Studies*, Vol. 31, No. 3 (November 1978) pp. 481-510, and previously unpublished results from research by Knodel.

[a] For France, the number of studies, some of which refer to more than one village; for Germany, the number of villages.

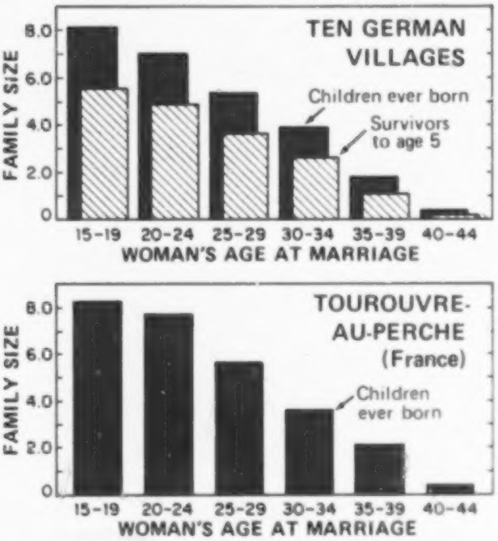
[b] Unweighted averages.

Because the average age of women at the time of their last birth varies so little in natural fertility populations, the age at which a woman starts childbearing becomes a crucial determinant of the number of children she will eventually have. Women who marry early and begin childbearing soon after marriage will bear children over a longer period than those who marry later. The importance of age at marriage in determining final family size in natural fertility populations is clearly illustrated in Figure 3 (next page), based on family reconstitution studies for ten German villages and a small town in France. Of course, relatively high infant and child mortality took their toll, reducing the number of children who were born to considerably fewer who survived. But, as the data for the German villages indicate, the relationship between the average number of surviving children and the mother's age at marriage is just as strong as that between age at marriage and total number of births.

Although couples in natural fertility settings apparently never deliberately

Figure 3. Family Size by Woman's Age at Marriage in Pretransition Europe

(Children ever born and survivors to age 5 for couples married before 1850 in ten German villages; children ever born to couples married 1665-1770, Tourouvre-au-Perche, France)



Source: Knodel, 1978 (see Table 2); and Hubert Charbonneau, *Tourouvre-au-Perche aux XVIIe et XVIIIe siecles*, Institut National d'Études Demographiques Cahier No. 55 (Paris: Presses Universitaires de France, 1970).

try to stop having children, there is a surprisingly wide variation in the level of fertility that characterizes these populations. Indeed, the striking variation in natural fertility levels is one of the most important findings of the recent research in historical demography. Table 3 illustrates this for different parts of Germany prior to the beginning of the transition. To make the comparison, we use the total marital fertility rate which represents the total number of births a woman would have if she married at exact age 20, survived to age 50 with her husband, and continued bearing children until that age at the age-specific fertility rates that were actually observed for the particular villages. In the three Bavarian villages, such a woman would have averaged over two more births than her counterpart in the two East Friesland villages. Variations in the levels of natural fertility revealed by other family reconstitution studies are even more extreme than this.

Several reasons could account for these differences, but it is important to recall that deliberate attempts to limit family size are not among them. Factors that can influence the interval between births and thus the level of fertility, but which are generally not dependent on the number of children already born, include variations in the frequency and duration of breastfeeding, periods of separation due to seasonal migration of one of the spouses, variations in the frequency of intercourse, customs prohibiting resumption of intercourse for some period following a birth, and nutritional levels of the population. Of these, breastfeeding patterns are most important.[8] Breastfeeding tends to delay the resumption of ovulation after a woman gives birth, thus increasing the length of the interval between a birth and the next

Table 3. Overall Marital Fertility in Natural Fertility Societies

(Family reconstitution studies of German villages for couples married before 1850)

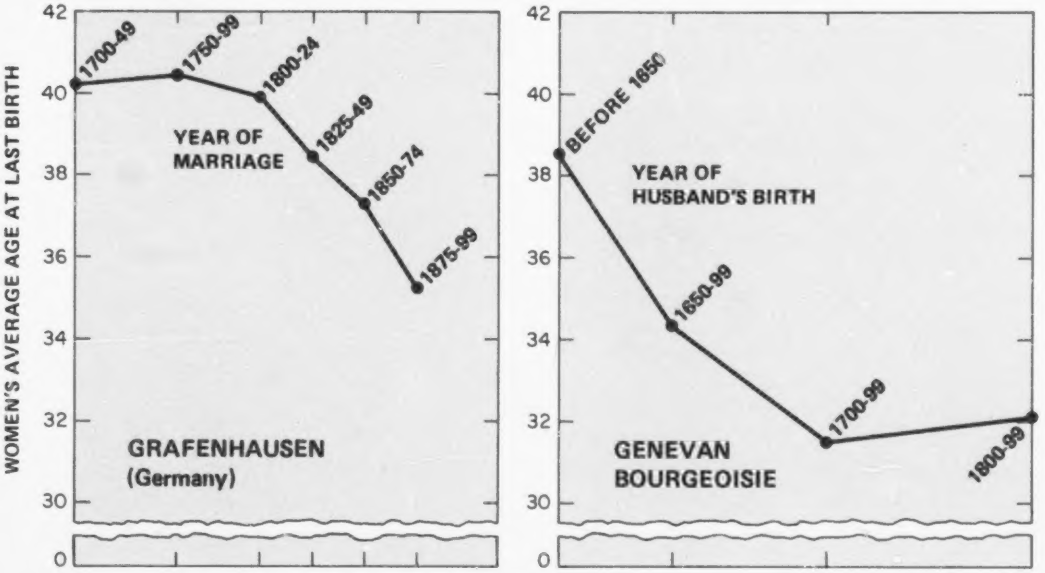
Location	Total Marital Fertility Rate[a]	Index of family limitation (m)[b]
3 villages, Bavaria	10.0	.03
4 villages, Waldeck (Hesse)	8.4	−.02
2 villages, East Friesland	7.6	.16

Sources: Knodel, 1978 (see Table 2), and previously unpublished results from research by Knodel.

[a] The Total Marital Fertility Rate equals the sum of the age-specific marital fertility rates for each five-year age group above age 20 multiplied by 5. It represents the number of births a woman would have who married at age 20 and remained married at least through age 49.

[b] For explanation, see text page 14.

Figure 4. Trends in Average Age of Women at Last Birth: Grafenhausen and Genevan Bourgeoisie, 17th-19th Centuries



Sources: Knodel, 1978 (see Table 2); and Louis Henry, *Anciennes familles genevoises*, Institut National d'Études Démographiques Cahier No. 26 (Paris: Presses Universitaires de France, 1956).

pregnancy. The effect can be to extend the average birth interval for as much as 12 to 18 extra months.[9]

From various sources, we know that breastfeeding was not customary in the 19th century and probably even earlier in the areas where the three Bavarian villages of Table 3 are located but was quite common and probably averaged close to a year after each birth in East Friesland. This probably explains much of the difference in predecline fertility levels between the two sets of villages.

Measuring family limitation

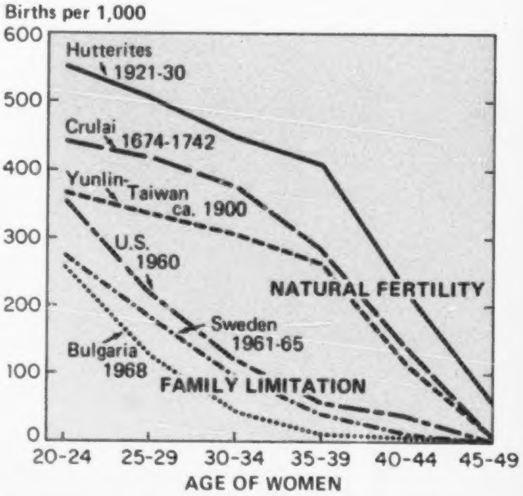
One of the important advances of modern historical demography has been the development of indirect techniques to determine whether married couples were practicing family limitation. These techniques are based on measures which can be derived from family reconstitution data and sometimes from official statistics, such as fertility rates of married women at different ages and the age of mothers at last birth. They are based on the observation that couples generally terminate childbearing earlier and marital fertility declines more rapidly with age where family size is deliberately limited than in natural fertility situations. The reason for this is that most married couples who wish to limit the children they have concentrate their childbearing in the earlier part of the wife's fertile period. Where family limitation is common and birth control widespread, women are considerably younger when they finish childbearing than they are in natural fertility populations. Women married in the 1950s in the U.S., for example, were on the average around 31 years of age at the birth of their last child,[10] compared to the average of about 40 noted in pre-fertility-decline French and German villages.

Figure 4 illustrates how this age at

last birth declined during the historical fall in fertility in two populations for which family reconstitution studies are available. Grafenhausen is a German village where the transition from natural fertility to family limitation began unusually early. As can be seen, the average age of mothers at their last birth declined steadily for couples married during the 19th century. The Genevan bourgeoisie represent a very different population. They were an elite group who began practicing family limitation early in the 17th century, far ahead of other European couples. They show the same drop in the age of mother at last birth although at an earlier time. Naturally, as long as couples have children at all, the mother's age at last birth cannot decline indefinitely and, as we see for the Genevan bourgeoisie, it eventually levels off.

Figure 5. Marital Fertility Age Patterns with Natural Fertility and Family Limitation

(Age-specific marital fertility rates, i.e. births per 1,000 women in different age groups)



Source: John Knodel, "Family Limitation and Fertility Transition: Evidence from the Age Patterns of Fertility in Europe and Asia," *Population Studies*, Vol. 31, No. 2 (July 1977) Figure 1, p. 222.

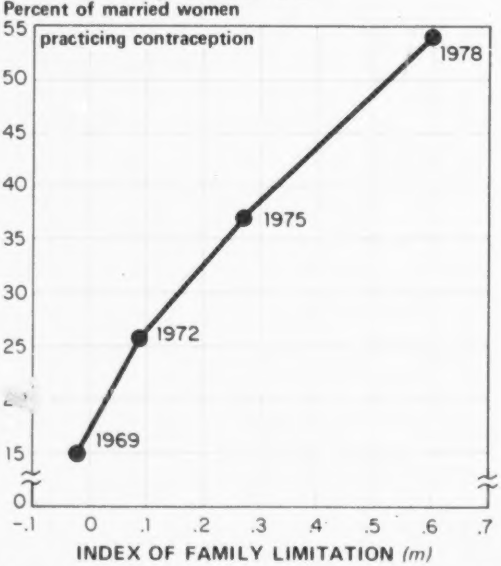
A more complicated but extremely valuable indicator of family limitation has recently been developed by Ansley Coale and James Trussell.[11] Their index of family limitation, called *m*, is based on the observation that the age pattern of marital fertility reflects the degree of family limitation practiced in a population. In natural fertility populations, the overall level of fertility may vary widely, as we have seen. However, the reasons for these differences generally have nothing to do with the number of children born and the main thing that affects the shape of the fertility curve—or pattern of age-specific marital fertility rates—over women's childbearing years is the decline in the physiological ability to bear children as they approach their forties. The three natural fertility populations shown in Figure 5 (the Hutterites of North Dakota in the 1920s, Crulai, a French village before 1750, and a Taiwanese village about 1900) actually had very different levels of overall marital fertility. However, in all three, marital fertility rates remained relatively high until age 35-39 before falling off. The other three populations in Figure 5 (the U.S., Sweden, and Bulgaria in the 1960s) display the very different pattern typical in populations where family limitation is common: marital age-specific fertility rates fall much sooner and faster as women move through their childbearing ages.

The Coale-Trussell index of family limitation is calculated by comparing the age pattern of marital fertility rates in a given population with a "standard" natural fertility pattern, based on a series of populations that are presumed to practice little or no birth control. The index *m* is constructed so that it will equal zero if the shape of the fertility schedule in question is identical to that of the standard natural fertility schedule. The faster marital fertility falls with age, the greater the amount of fertility control implied and the higher the value of *m*. Small differences in *m* values do not necessarily indicate meaningful differences in the extent of family limitation, nor do slight departures from zero necessarily indicate meaningful deviations from natural fertility. In the villages shown in Table 3 (page 12), for example, the value of *m* varied slightly but remained close enough to zero to suggest that family limitation was not practiced. On the other hand, modern populations in which contraception is widespread, like the three at the bottom of Figure 5, usually have *m* values well over 1. Thus, moderate or large differences in *m* between populations at one point in time or consistent trends over time in a series of *m* values can be interpreted with reasonable confidence as reflections of different degrees of fertility control.

In historical studies of fertility, of course, we have no direct information on birth control. For modern populations in both the West and the developing world, however, there are survey data on the extent to which couples practice birth control. Using such data for Thailand, Figure 6 shows how the increasing practice of birth control corresponds with a rise in the value of *m*. The results are similar for others of today's developing countries. This helps confirm the value of the *m* index as a proxy for direct information on family limitation.

The rise in *m* values as Europe's historical fertility transition progressed is illustrated in Figure 7 (next page), based on three family reconstitution studies which were chosen to represent diverse geographical, socioeconomic, and cultural settings. The village of Grafenhausen is located in southwest Germany and Meulan is a small town in France. In both these populations, as well as in the two Hungarian villages, *m* shows a steady increase once it moves much above zero, signaling the onset and spread of family limitation. It is interesting that in these three quite different settings the age pattern of fertility shifted in a similar manner.

Figure 6. Index of Family Limitation (m) and Percent of Married Women Practicing Contraception: Thailand, 1969-78

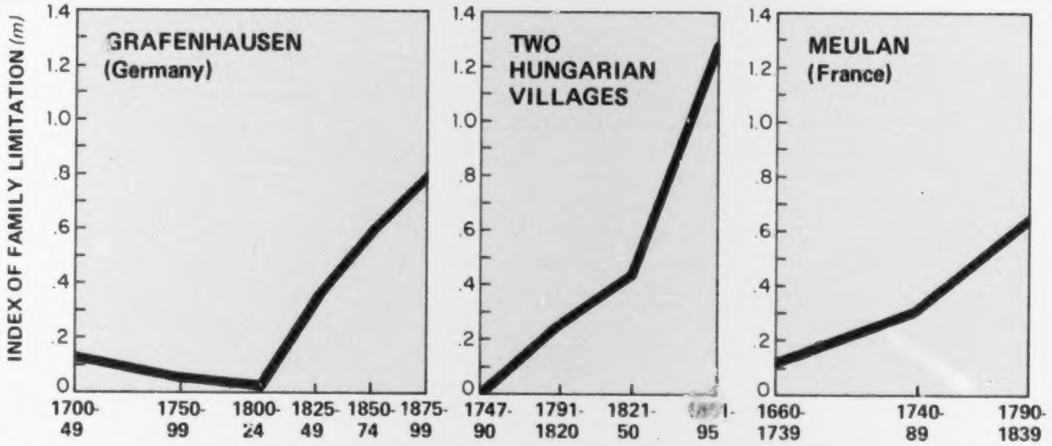


Sources: *National Longitudinal Study of Social, Economic and Demographic Change* conducted by the Institute of Population Studies, Chulalongkorn University, Bangkok; *Survey of Fertility in Thailand* conducted by the Institute of Population Studies, Chulalongkorn University, and the National Statistical Office of Thailand; and *Survey of Contraceptive Prevalence* conducted by the National Institute of Development Administration.

Macro-level fertility measures

The recent macro-level studies of Europe's historical fertility transition have also developed ingenious measures to follow the transition from the data available, this time for national or provincial populations. Formerly, most macro-level studies concentrated on trends in the crude birth rate—the number of births in a year per 1,000 of the total population in that year. This can be very misleading. For example, France and Ireland around 1900 had almost the same crude birth rate. This result was obtained in France by family limitation (within marriage) and in Ireland by high proportions of single persons in the reproduc-

Figure 7. Index of Family Limitation (m): Grafenhausen, Two Hungarian Villages, and Meulan, 17th-19th Centuries



Sources: Knodel, 1978 (see Table 2); Rudolf Andorka, *Determinants of Fertility in Advanced Societies* (New York: The Free Press, 1978); and Marcel Lachiver, *La population de Meulan du XVIIe au XIXe siecle* (Paris: SEVPEN, 1967).

tive ages. The more recent macro-level studies in historical demography have emphasized the importance of "decomposing" a country or province's overall fertility into the components that influence that level: the fertility of married couples, fertility outside marriage, and the proportion of the population that is married.

As part of Princeton University's European Fertility Project, Ansley Coale devised a set of indices which permit this kind of decomposition of overall fertility from the type of data available in published census and vital statistics reports.[12] The censuses which started in most Western countries toward the end of the 19th century commonly recorded the ages and marital status of the population while vital statistics reports provided time series of the number of births, classified as legitimate or illegitimate (but generally not classified by age of mothers). The Coale indices provide measures of overall fertility and also of its three components: marital fertility, non-marital fertility, and the proportions of married women at different ages.

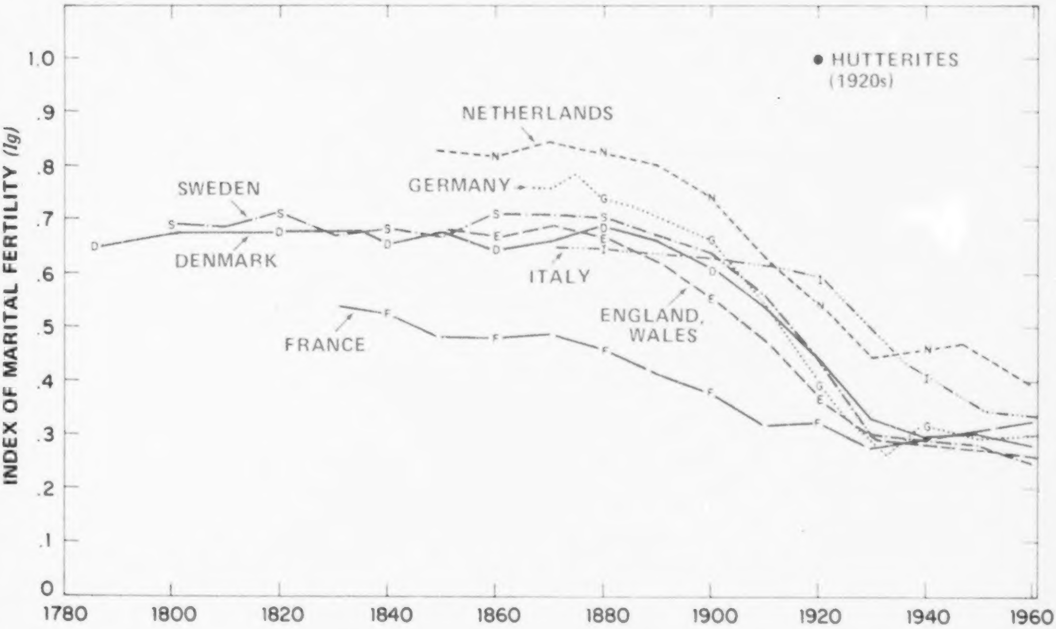
This is the logic behind the index of marital fertility, called I_g, the most useful for following 19th century trends in European fertility. We know from the vital statistics the number of legitimate births that married women in any given country or province have had in a particular period. We compare this number with the number of births we would expect them to have, knowing the number of married women in each age group from the census, if these women experienced the highest marital fertility ever reliably recorded for an entire population. The ratio of the actual to the expected number of births is the index of marital fertility. This index can be calculated for women at different times and places and compared either across populations or over time. The scale of comparison was chosen so that there would be a maximum value unlikely to be exceeded by European populations. As the standard, Coale selected the fertility of Hutterite women of North Dakota married in the 1920s. This is considered the record as human fertility goes. A small religious sect, the Hutterites are a prosperous rural population with a pattern of breastfeeding that keeps birth intervals short, and their creed forbids birth control of any kind. They are a well documented example of natural fertility in the 20th century. The average Hutterite woman of the 1920s, married at age 20, would have had 11 children.

For comparison purposes, the marital fertility index (I_g) of the Hutterites is given the value of 1. No national population of the 19th century reached that level, but certain provinces came close: Flanders, or Schwabia, about 1860, for example, had a marital fertility at 95 percent of the Hutterites. And some family reconstitution studies have revealed villages where I_g even exceeded 1 for certain periods, although rarely by more than a few percent.

Figure 8 traces the trend in the I_g index over time in seven European countries compared with that of the Hutterites in the 1920s. Two things should be noted. First, where the lines can be drawn back far enough, it is usual to find I_g on a high plateau, with only minor fluctuations, until a decisive and irrevocable plunge occurs. Second, this high predecline level varies from country to country, but is usually between 60 and 80 percent of the performance of the Hutterites. The trend for Denmark shown in Figure 8 emphasizes these two points. From the census of 1787 on to 1880, marital fertility hovers at about 65 percent of the Hutterites. While the reasons for the relatively low predecline level of fertility are uncertain, the quick drop in Denmark's marital fertility after 1890 clearly represents a break with the past.

Prior to the Princeton fertility project, which yielded these data, and the family reconstitution studies discussed in the

Figure 8. Index of Marital Fertility (I_g): Selected European Countries, 1787-1960



Sources:

England and Wales, France, Italy, Netherlands, Sweden: Princeton European Fertility Project.

Denmark: Etienne van de Walle, "Problèmes de l'étude du déclin de la fécondité européenne," *Recherches Economiques de Louvain*, No. 4, 1969.

Germany: John Knodel, *The Decline of Fertility in Germany, 1871-1939* (Princeton: Princeton University Press, 1974).

previous section, some demographers assumed that marital fertility in the past remained not only relatively constant, but also almost uniformly high from country to country. Before family limitation became common, they felt, reproduction within marriage must have been governed mainly by human physiology. According to this reasoning, we might expect that the Hutterite level would provide a reasonable upper limit, and deviations from this would indicate the use of contraception. We now know this not to be the case. Predecline levels of I_g or other measures of marital fertility tend to be relatively constant over time but vary greatly among countries, provinces, or villages. Moreover, urban marital fertility was usually below the level of rural areas. We know better today than to attribute fertility differentials in the past automatically to deliberate birth control. The factors which explain these variations are poorly understood. They may include some birth control. More probably, as already mentioned, they represent a mix of physiological factors, social customs, and health factors related to the environment or to hygiene. Differences in breastfeeding customs or in the frequency of sexual relations, nutritional deficiencies, or perhaps the prevalence of diseases such as tuberculosis or gonorrhea, about which little evidence has surfaced, are all potential culprits. For whatever reasons, however, it is clear that marital fertility was consistently high in some parts of preindustrial Europe and low in others.

Leaving aside the differences in the predecline level of marital fertility and concentrating on the trends, we see that there are no sustained, one-way trends, except in France (Figure 8), much before 1880. Table 4 shows index numbers of marital fertility to 1910 for selected countries, with the value of I_g for 1880 set at 100 for each. Values above 100 indicate that I_g was above the 1880 level and values below 100 indicate that I_g was below that level. Only in Belgium and Switzerland had the decline in fertility clearly started before 1880. Wherever the data go back far enough, we find a plateau of high marital fertility, terminated quite abruptly by a clear downfall.

If we had to rely solely on this more-or-less level plateau in the marital fertility index, it would be difficult to infer that family limitation was not practiced during the predecline period. However, we also have the findings from family

Table 4. Index Numbers of Marital Fertility: Selected European Countries, 1850-1910

(I_g in 1880 = 100)

	Date									
Country	1850		1860		1870		1880	1890	1900	1910
Belgium		109		109			100	89	71	59
Denmark	99		94		96		100	97	89	77
England-Wales	100		99		102		100	92	82	69
Germany					103		100	96	90	73
Ireland					99		100	101	100	101
Italy				105	100		100	99	98	95
Netherlands	100		98		102		100	97	90	78
Norway				93		100		98	93	90
Scotland			101		103		100	95	86	77
Sweden	96		101		101		100	96	91	80
Switzerland			107		102		100	96	91	76

reconstitution studies of many village populations in various countries, using the indirect techniques already discussed. They generally indicate an absence of family limitation in the 17th and 18th centuries, the period to which most refer. Where family limitation is evident, it usually emerges only after an earlier period of natural fertility. In addition to this evidence, data are available for a few countries on age-specific marital fertility which allow the computation of m, the index of family limitation, at the national or state level in the pre-fertility-decline period (see Table 5). All of these predecline m's are close to zero, meaning that the age distribution of fertility reveals little or no birth control within marriage. Moreover, in the one country where we can compute both I_g and m from 1800 on, Sweden, the beginning of the sustained decline in I_g coincides with a transformation in the age distribution of fertility as revealed by the start of a steady increase in m. (See Figure 9, page 27.) Definitions of m and I_g for quick reference are given in the box on the next page.

Table 5. Index of Family Limitation (m) Before Fertility Decline: Selected Western Populations

Country and date	Index of family limitation (m)
Denmark, 1860-69	.18
Finland, 1871-80	.08
New South Wales, Australia, 1871	.13
Norway, 1[illegible]4-76	-.13
Scotland, 1855	.21
Sweden, 1871-80	.80

Data computed from the following sources:

Denmark: Etienne van de Walle, "Problèmes de l'étude du déclin de la fécondité européenne," *Recherches Economiques de Louvain*, No. 4, 1969, p. 282.

Finland and Sweden: Jokinder Kumar, "A Comparison of Indian, Swedish, and Finnish Fertility," *Population Studies*, Vol. 25, No. 2 (July 1971) p. 271.

New South Wales and Scotland: C. J. Lewis and J. Norman Lewis, *Natality and Fecundity: A Contribution to National Demography* (New York: Arno, 1976 reprint of 1906 edition) p. 44.

Norway: Louis Henry, "Some Data on Natural Fertility," *Eugenics Quarterly*, Vol. 8 (March 1961) p. 84.

Marital fertility is the key variable in the fertility transition, but a word must be said about the other Coale indices. Another potent factor of variation in overall fertility has nothing to do with marital fertility. It is the proportions of women in the childbearing ages who are married. The effect of this is measured by the index I_m. If every woman in a population got married at 15 and remained married until 50, I_m would be equal to 1, and overall fertility (expressed by a third index, I_f) would be equal to marital fertility (or I_g). In fact, the effect of celibacy, late marriage, and marriage dissolution reduces I_f, the index of overall fertility, in all populations, but this varied a great deal among European countries. In 1900, for example, the proportion married, I_m, ranged from .325 in Ireland to .731 in Bulgaria. This means that in Ireland, where women married late if they married at all, 67.5 percent of potential fertility was "lost" because of the prevailing pattern of marriage. In Bulgaria, thanks to early and almost universal marriage, the loss of fertility was only 26.9 percent.

The combination of nuptiality patterns and fertility within marriage yield very different overall levels of fertility. In Eastern Europe, overall fertility tended to be higher than where the Western European pattern of marriage prevailed. In Russia, about 1900, I_f was .546. This means that overall fertility reached 54.6 percent of what it would have been if all Russian women, whatever their marital status, had reproduced as vigorously as the married Hutterites. At the same time, the reproductive strategies prevailing in France (high nuptiality and contraception within marriage) and in Ireland (late marriage and much celibacy combined with uncontrolled marital fertility) were producing much lower, but almost identical overall fertilities. The indices of this period for these three

Key Measures for Studying Historical Fertility Trends

m = Index of Family Limitation

Equals zero or close to zero in natural fertility populations. Rises in value as numbers of births to married women at older ages fall, indicating that couples are increasingly attempting to stop childbearing before women reach the physiological maximum age for childbearing (av. = about age 40). Usually calculated for small historical populations, based on data for individual families derived from church records of baptisms, marriages, and burials.

Example:

For Grafenhausen, a German village, m stood at .01 in 1800-24; .49 in 1825-49; and .79 in 1875-99.

I_g = Index of Marital Fertility

Differs in value from 1.0 as annual births to married women of different ages in a population fall short of the age-specific fertility recorded in the 1920s for married women of the Hutterites of North Dakota (av. completed family size = 11 children for women married at 20 and surviving with husbands to age 50). Usually calculated for populations at the national or provincial level, based on data from censuses and official birth records.

Example:

Denmark's I_g was .678 in 1801; .686 in 1880; .609 in 1901; .327 in 1930; and .283 in 1960 (i.e., 28.3 percent of the childbearing performance of the average Hutterite married woman in the 1920s).

countries were as follows:

	Marital fertility I_g	Proportion married I_m	Overall fertility I_f
Russia, 1897	.773	.687	.546
France, 1901	.383	.543	.238
Ireland, 1901	.706	.325	.235

Note that the effects of I_g (marital fertility) and I_m (proportion married) multiply to give I_f (overall fertility). Thus, for Ireland, the value of I_f, .235, is close to the product of I_g and I_m (.706 × .325 = .229). The difference is accounted for by illegitimate fertility which in general was relatively low in these historical societies. These indices provide convenient instruments to distinguish the effects of nuptiality and marital fertility which would be confused in the usual measurements such as the birth rate. This can be done in most of the administrative units of Europe, and provides a unique, if still rough, image of its fertility history.

Interpreting the New Findings

The overall picture that emerges from the micro-level studies based on family reconstitutions, the macro-level studies based on conventional demographic sources, and the gaps filled with the help of suggestions from social history and contemporary observers leads us to four main conclusions which have important bearing on our understanding of the process of fertility decline. They can be summarized as follows:

1. The past was largely characterized by natural fertility, that is, the deliberate practice of family limitation was mostly absent (and probably unknown) among most of the population prior to a fairly recent time. This was true, even though a substantial proportion of births may have been unwanted. High infant and child mortality may have reflected unconscious efforts to eliminate unwelcome children.

2. The transition from high to low fertility represented a shift from natural fertility to family limitation, occurred rapidly, and was an irreversible process once under way.

3. The onset of long-term fertility decline was remarkably concentrated in time and took place under a wide variety of socioeconomic and demographic conditions.

4. Differences in the start and in the speed of the fertility decline seem to have been determined more by the cultural setting than by socioeconomic conditions.

These observations are elaborated in the next sections of the *Bulletin* before we turn to the lessons that the findings suggest for the prospects of fertility decline in today's developing countries.

Pretransition Fertility Behavior

From the new historical evidence it seems clear that, prior to the onset of the fertility decline in Western Europe, the practice of family limitation was largely absent; the available means of birth control were ineffective, unknown, or unthinkable for married couples; but substantial portions of the population may have harbored latent motivations for reduced fertility.

Absence of family limitation

As we have seen, recent research suggests that if the data were available it would be possible to go back to a time in every population when fertility was natural and family limitation unpracticed. From selected micro-level studies, we see that prior to the long-term decline in fertility in Western Europe the index of family limitation, *m*, was close to zero and unchanging and the age of mothers generally around 40 at the time of their last births. At the same time, long plateaus of high fertility at the overall level of provinces and countries, as measured by the I_g index, suggest that there was no systematic attempt by significant proportions of married couples to control their fertility during this period.

We believe that family limitation was not practiced to any great extent at this time because birth control was not known or acceptable to a majority of people and thus did not constitute a real option for married couples. Indeed, the very idea that married couples could plan their family sizes was probably foreign to most people's mentalities. Our arguments are derived from indirect evidence, the only type available for the past. But they are largely confirmed by literary and cultural material.

Two arguments have been used to demonstrate that methods of birth control are always available in traditional societies and could have been used by married couples in pretransition Europe to curtail childbearing if they so desired. First, references to methods of contraception and abortion appear in many different cultural contexts. And second, at least one technique, withdrawal, seems to require no special knowledge or implements and presumably can be reinvented by every couple having some understanding of the mechanism of reproduction. But these arguments are deceptive.

It is true that birth control is discussed in almost all human cultures, and the preindustrial past of Western populations is no exception.[13] The medical literature inherited from the Greeks, the Romans, and the Arabs is quite explicit about various means of avoiding pregnancies. Unfortunately, however, the recommended methods were mostly ineffective. "Potions of sterility," which were vigorously condemned by theologians and moralists, either never existed, or derived their supposed power from magic or "placebo" effects.[14] If any oral contraceptive existed before the invention of the pill about 1955, the recipe has been lost. The potions of sterility may have been abortifacients. However, informed medical opinion today contends that no effective substance has come down from the past that can reliably procure the interruption of a pregnancy. Desperately trying to abort their pregnancies, large numbers of women in the late 19th and early 20th centuries were ingesting a surprising variety of chemical or vegetable drugs, quinine, phosphorous, and various infusions of herbs. Often dangerous to the mother, these substances sometimes produced the desired effect. But it is pointed out that, "Since at least ten percent of all conceptions end in spontaneous abortion, it follows that if ten women take sugar lumps as abortifacients one will 'successfully' abort."[15]

Effective methods of abortion and contraception *did* exist. Sharp instruments were used to kill the fetus. However, this was extremely dangerous for the mother and probably reserved for pregnancies where the shame of birth would have been worse than death, that is, outside of marriage. Condoms appeared early on the scene but were used mostly with prostitutes as protection from syphilis, and Condorcet at the end of the 18th century believed that as a contraceptive "this means has been up to now absolutely useless for the human species because it remains little known"[16] Some English propagandists of the early 19th century favored the sponge because it was a female contraceptive and they thought men could not be trusted with the most universally accessible birth control technique, withdrawal or coitus interruptus.

Condemnation of the "sin of Onan" goes back to the Bible but, strangely, withdrawal occupies little place in the voluminous theological discussion of contraception.[17] Islamic literature has long discussed and generally approved of withdrawal for contraception, but mostly in extramarital contexts. In the West, coitus interruptus is rarely cited before the 18th century, although it was well established in France by 1800 and there is little doubt that this is the method that was initially most responsible for successful family limitation when Europe's fertility transition eventually began. English social reformers, seeking ways to reduce the large burden of children on the working classes, noted its widespread use in France in the early 19th century and church archives from the time reflect the growing problem of "conjugal onanism." But this simplest method, which appears accessible to every couple, may have been unknown, unacceptable, or for practical purposes unavailable to most motivated couples before a fairly recent date.

Could it be that withdrawal is less obvious than it seems as a way to avoid conception and has to be learned from the outside? Or does the key to its late adoption lie in the fact that coitus interruptus is a male method and threatened what was seen as the male prerogative of sexual pleasure? Possibly women were able to impose its practice only when they had achieved equality within marriage. Margaret Sanger hints of this in her description of working class families in New York at the beginning of this century:

> "The menace of another pregnancy hung like a sword over the head of every poor women I came in contact with that year. The question which met me was always the same: What can I do to keep from it? or what can I do to get out of this? Sometimes they talked among themselves bitterly. 'It's the rich that know the tricks,' they'd say, 'while we have all the kids.' Then, if the women were Roman Catholics, they talked about 'Yankee tricks,' and asked me if I knew what the Protestants did to keep their families down. When I said that I didn't believe that the rich knew much more than they did I was laughed at and suspected of holding back information for money. . . . The few simple means of limiting the family like coitus interruptus or the condom were laughed at by the neighboring women when told these were the means used by men in the well-to-do families. That was not believed, and I knew such an answer would be swept aside as useless. . . ."[18]

Useless, because women did not believe they could convince their men. We suspect that similar attitudes have kept married couples from limiting their families even after practical methods were within reach of individuals.

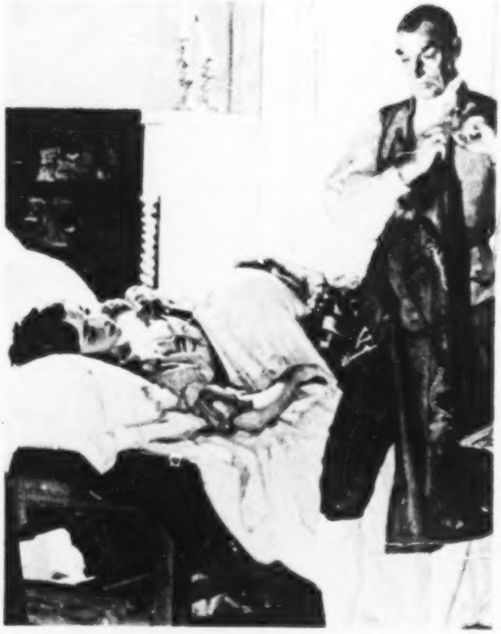
The same was probably true of abstinence. It is likely that abstinence was generally recognized as a means of avoiding pregnancy, but this too requires male cooperation and means repeated denial of immediate pleasure for the much more distant benefits that may be perceived in connection with avoiding childbirth. And men did not have the same stakes as women in avoiding the dangers of childbearing and debilitating effects of closely spaced pregnancies. One of the few actions women themselves could take to reduce their fertility was to deliberately prolong breastfeeding. Contemporary observers mention that some women did indeed do so, however ineffective and inconvenient that might be.[19]

Literary references abound to suggest that family limitation was generally deemed impractical or scandalous behavior. Churches opposed it on moral grounds. And even when they were not invoking a moral argument, most philosophers thought, as did Diderot, that "in spite of all the contrary resolutions and systems, it is impossible for men to cheat the wish of Nature in such a way as to influence population ever so little."[20] Writing in his First Essay of 1798, Malthus also declared that "towards the extinction of the passion between the sexes, no progress whatever has hitherto been made."[21] In other words, couples would inevitably bear children once married. Under the pen of Malthus and many of his predecessors and contemporaries, celibacy and late marriage rather than family limitation appeared as the normal means to avoiding the burdens of a large family. In this, they were substantially describing the situation of their time where family size was primarily determined by the wife's age at marriage and the time lived in wedlock before death parted the spouses. In French and German villages of the 18th century, two to three years of marriage produced one additional child on the average. Getting married depended on material assets such as a piece of land or a trade; thus it appears that societal mechanisms rather than individual foresight served to adjust the size of the population roughly to the available resources. In frontier situations as in America or on the agricultural plains of Eastern Europe, marriage was earlier and more universal than in the old countries of Western Europe and population growth was higher.

Unwanted births

It has been argued that natural fertility in the past can be explained in another way than by the non-availability of birth control: couples had little motivation to limit childbearing because they wanted many children—more than the number likely to survive under conditions of high mortality. Indeed, this is often given as the reason why fertility remained high for as long as it did. But is it true that "the age-old attitude toward high fertility was always similar to the attitude toward longer life: high fertility was considered a blessing"?[22] We believe the answer is no and that in many areas of Europe during the 18th and 19th centuries significant numbers of births were unwanted, especially by their mothers, but that this did not result in use of such birth control methods as were available.

There are obvious instances where the motivation to avoid childbearing existed. Fertility outside of wedlock must always have been one of them. We now know that illegitimate fertility began to decline about the same time as marital fertility.[23] This can hardly have been a coincidence. Rather it suggests that birth control was not widely used before the parallel declines in legitimate and illegitimate fertility and that the spread of practical knowledge and skills to



For married women in the pretransition era, there was no escaping the dangers and pain of incessant childbearing.

avoid unwanted births enabled both unmarried and married couples to reduce their fertility simultaneously.

From literary and legal sources, there is much evidence that even the upper classes often did not want large families because of their cost. Writing of the English peerage, historian Lawrence Stone notes:

> "Despite the need to secure the succession, an overfull quiver was by no means a cause of unmixed satisfaction. . . . In 1536 the Earl of Wilshire complained of poverty partly because his wife 'brought me forth every year a child' and both Lord North and the Earl of Northumberland advised against 'a multitude of unprofitable children.' The rise in the size of portions made girls peculiarly expensive and unwanted, though boys were still welcome so as to protect the direct male succession against the ravages of accident and disease. After three boys had been born, which was a situation which developed in at least one family in every five, there was a strong incentive to call a halt. It is therefore curious that there are few signs at this period of any practical steps being taken to prevent conception."[24]

The health of women of the aristocracy who were not breastfeeding and were therefore exposed to yearly pregnancies could be severely threatened in the era before contraception. Mme. de Sévigné's eloquent letters testify to this.[25] At 22, her daughter had married the 40-year-old Governor of Provence and had six deliveries in seven years. After a male heir was born in November 1671 (the third delivery), the grandmother wrote repeatedly to enjoin abstinence. In December 1671: "I beg you my love, do not trust the two beds: it is a subject of temptation. Have someone sleep in your room." In January 1672: "If Mr. de Grignan falls into temptation, don't believe he loves you!" In March: "Continue this nice custom of sleeping separately, and restore yourself. . . . I kiss your husband. I like him even better in his apartment than in yours." To her son-in law: "I warn you, if you don't give some rest to that pretty machine, out of affection and out of pity, you will destroy her without fail, and it will be a shame." Noting that he had "already killed two wives under him," she deplored his inattention to his wife's failing health. Abstinence was the only method Mme. de Sévigné recommended, however, and she made no reference to any other ways to avoid pregnancy.

The arguments against large families also struck a responsive chord in a large public beyond the upper classes. This comes through in French writings since medieval times, and can be confirmed from sources in other languages.[26] Because avoiding children within marriage was not an available option, much of the literature discusses the disadvantages of marriage, often taking a cynical and misogynist view, as in this verse recited for the groom at bourgeois weddings in France around 1530:

"He will have to feed children
Until they are of age
His daughters he has to marry
And give a huge sum to dowry

And the boys he has to provide
With an education or a trade
The children need so many things
As soon as they are born
That the poor man goes naked
And lives in great pain. . . .
These are the goods that a wife brings with
her."[27]

Thus, approximately the same arguments that contemporary parents use to justify family limitation were invoked by men against marriage. Defenders of the woman stressed that she got the worst of the bargain because she had to endure the dangers and pain of childbearing. Parallel to the economic and masculine argument against marriage, then, there developed a medical and feminine argument against excessive childbearing within marriage.

Infant mortality

High fertility in the past—and in developing countries today—is often viewed as an adaptation to high infant and child mortality. If this were true, we would expect that couples whose children all survived would adjust their reproductive behavior once reaching a desired number of children. But the evidence from village studies suggests that couples whose children all survived continued childbearing just as long as those who had lost some offspring; people's own experience with mortality hardly seemed to matter in determining future conceptions (see Table 6).

On the contrary, contemporary observers note that deaths of children were often welcomed as relief from the onus of parenthood. At the least, mothers and fathers were frequently indifferent to the loss of a child. Rudolf Braun describes attitudes among landless cottage workers in Zurich, Switzerland, at the end of the 18th century:

"When Uli Bragger was cured of a dangerous illness, his father said to him: 'God has heard your entreaties. . . . I, however, I'm willing to admit, did not think as you did, Uli, and would have considered myself and you fortunate if you had passed away'. . . . Johan Schulthess wrote: 'Hence so many parents not only think about it, but wish loudly and openly for the death of their children. You can hear—I'm speaking now as a witness—a needy woman murmur against heaven because a child of a well-to-do neighbor has died: 'I am not so lucky,' she says. 'If one of my children fell off the bench, instead of his breaking his neck, two of them would spring up in his place.' And another woman, a gleaner, walking next to her pastor in the street and holding the hand of a lively child hardly recovered from the smallpox, says without shame in front of both of them: 'Oh, if it had only died of the smallpox.'"[28]

Table 6. Impact of Child Mortality on Pretransition Marital Fertility

(Age of mother at last birth by number of children dead before reaching age 10: German villages, marriages prior to 1850)

Number of deaths among first three confinements	Mother's age at last birth
0	40.4
1	40.9
2 or 3	40.7

Source: John Knodel, "Natural Fertility in Pre-industrial Germany," *Population Studies*, Vol. 31, No. 3 (November 1978) p. 505, where more detailed data are given on individual villages. Results refer to all ages at marriage for unions lasting until the end of the wife's childbearing years.

In England, smallpox was commonly called "the poor man's friend."

Such evidence hardly tallies with the contention that couples refused to use birth control because they wanted many children. Rather, it suggests that many women continued having children because there was little option to do otherwise.

Abusive child care practices and general neglect appear to have been common in much of Europe. Outright infanticide was not unknown, particularly among unwed mothers, but far more common were traditional practices that led to what social historians now call "unconscious infanticide" or "infanticide by neglect." Such practices included sending the new born baby out to a wet nurse; dosing the infant with gin or opiates to keep it quiet; rocking the infant violently in its cradle until it was knocked into insensibility; leaving the child swaddled and unattended in its own filth for hours on end; and having the baby sleep in the same bed with the parents, thus risking "overlaying" and suffocation.[29] The custom of hand-feeding rather than breastfeeding young infants, which was widespread in parts of Europe, had a particularly devastating effect, given the deficient nutritional content of the alternative foods fed to infants and the appalling hygiene of the day.

Many of these customs seem to have been aimed at relieving the mother from the drudgery of child care in a situation where women were expected to labor all day alongside their husbands and to assume all the house work. Although not found everywhere, collectively these practices surely contributed to the high infant and child mortality that characterized much of Europe in the 18th and 19th centuries.

One nearly universal practice that undoubtedly contributed directly to those statistics was abandonment or "exposure" of children.[30] Large numbers of children were involved. There were, for example, more than 7,000 foundings every year in Paris alone in the years before the French Revolution and their risks of dying in the "welfare" system were high. Data for the end of the 18th century suggest that a third of the abandoned children were legitimate, and many came from bourgeois, master craftsman, and merchant families. An edict of 1779 declared:

> "His Majesty has observed with sadness that the number of exposed children increases from day to day, and that most today originate in legitimate bonds, so that the asylums originally instituted to prevent those crimes to which shame might induce a misguided mother have progressively become deposits favoring the criminal indifference of parents."[31]

Carlo Corsini has unearthed remarkable data from the Hospital of the Innocents (or foundlings) of Florence in Italy.[32] Because the hospital kept records on the parental origin and fate of each baby, Corsini was able to link the children with their mothers in the nearby villages of Fiesole and South Godenzo. A large majority of the foundlings were legitimate children and, for the period 1775-94, they represented 4.2 percent of legitimate births in the two villages. (The percentages had been increasing throughout the 18th century, partly because of the hospital's growing liberality in reaction to deteriorating economic conditions.) Most interesting is the fact that abandonments were clearly related to the number of children in the family, as shown in Table 7. Apparently, Tuscan peasants of the 18th century were resorting to child abandonment as a means of family limitation. The situation cannot be held as typical since the institutions in Florence were making the procedure uncommonly convenient for overburdened parents. But this suggests that, given a chance, many parents would have attempted to limit their families. Corsini comments that abandonment of infants declines and

Table 7. Child Abandonment: Tuscany, Italy, 18th Century

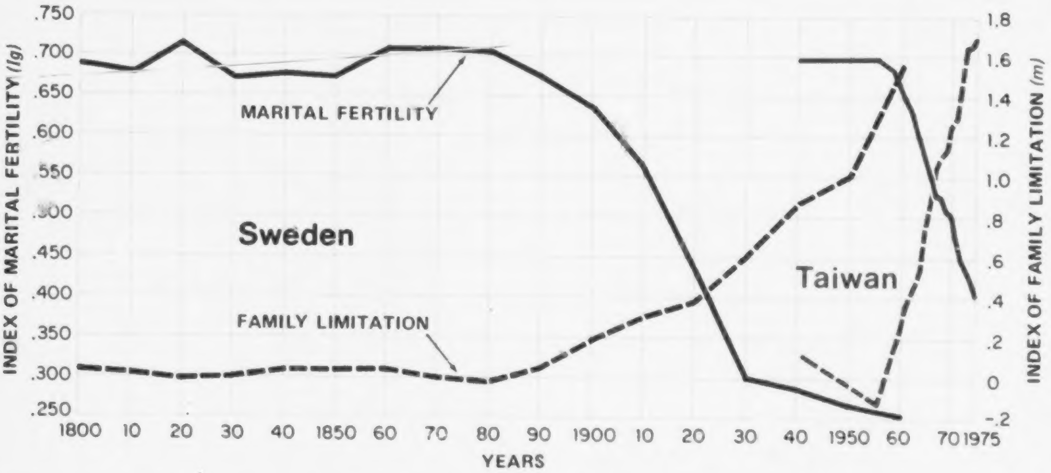
(Legitimate children abandoned at the Foundling Hospital of Florence by number of children in the family: two nearby villages, 1775-94)

Number of children in family	Percent of children abandoned
1-3	24.8
4-5	37.1
6 plus	50.6

Source: Carlo A. Corsini, "Self-Regulating Mechanisms of Traditional Populations Before the Demographic Revolution: European Civilizations," in International Union for the Scientific Study of Population (IUSSP), *International Population Conference: Mexico 1977*, Vol. 3 (Liege, Belgium: IUSSP, 1977), adaptation from Table 3, p. 12, and personal communication with the author.

Note: Refers to 170 children from 133 families who abandoned at least one child and for whom there are complete records.

Figure 9. Index of Marital Fertility (I_g) and Index of Family Limitation (m): Sweden, 1800-1960, and Taiwan, 1940-75



Source: John Knodel and Etienne van de Walle, "Lessons from the Past: Policy Implications of Historical Fertility Studies," *Population and Development Review*, Vol. 5, No. 2 (June 1979), adapted from Figure 1, p. 223, with permission.

disappears after the middle of the 19th century: "this is concomitant with the diffusion of voluntary means of limiting conception."

It seems plausible that deliberate abandonment and negligent childrearing practices and the resulting infant and child deaths served as a way to limit family size in the absence of birth control, particularly in view of the apparent unwillingness of parents to change their ways despite the frequent decrying of these practices by authorities. From this perspective, the high infant and child mortality rates found in much of Europe prior to the fertility decline can be considered as much of an accommodation to high fertility as the opposite. In other words, the conventional argument that couples maintained high fertility in part to counteract high infant and child mortality may have the causal ordering reversed, a conclusion which recent research in Latin America suggests may also be true of developing countries today.[33] Such an interpretation helps explain why marital fertility began to decline in some areas of Europe while infant mortality was still very high.

In sum, the literary evidence and commentaries of contemporary observers are consistent with the idea that family limitation was not practiced in pretransition Europe because birth control was largely inaccessible, unknown, or unthinkable for married couples. However, the motivation to avoid excessive childbearing existed and was met, at least partly and largely unconsciously, by such palliatives as late marriage, child neglect and abandonment, or even infanticide.

Irreversibility of Family Limitation and Fertility Decline

The shift from natural fertility to family limitation and the resulting decline in marital fertility reflected a radical change in the reproductive behavior of couples and societies. It was sudden and proceeded irreversibly until much lower levels of fertility were reached.

The time series shown in Figure 9 for the index of family limitation, *m*, and the index of marital fertility, I_g, for Sweden, which began its fertility transition in the late 19th century, and for Taiwan, where fertility began to fall only two decades ago, are remarkably similar. In both countries, once the *m* index starts to rise above a minimal level and once the I_g index starts to fall below the predecline level, the trends continue uninterruptedly until radically different levels are reached. Only the pace differs: very fast in Taiwan and slow in Sweden.

This association of rising *m* values with the decline in marital fertility helps confirm that the fertility transition resulted from a new form of reproductive behavior rather than from an extension of previous patterns. Recall that the *m* index measures the age pattern of marital fertility, independently of the overall fertility level. The rising *m* values mean that the fertility transition was set off by a marked decline in women's fertility at older ages, or stopping behavior. Before the transition, any differences there were in fertility levels were due to differences in spacing between births, whether or not deliberate, and not to the age at which women bore their last child, which, as we have seen, averaged around 40 in all populations for which we have data. Thus it was stopping behavior—or what we call family limitation—rather than birth spacing that was responsible for touching off the descent of fertility toward modern levels. Average birth intervals remained fairly constant as fertility started to drop. It was only at a later stage of the transition that a lengthening of birth intervals contributed to reduced fertility levels.

From recent research we know that the patterns for Sweden shown in Figure 9 were typical of Europe's historical record. Once family limitation rose above a minimal level, it continued to increase steadily until much higher levels of control prevailed. Marital fertility began falling about the same time and similarly continued falling until it reached a level at least 50 percent below what it had been in the predecline era. This irreversibility of the trends once started can be seen in national, provincial, and village populations and even in social elites and other groups where the transition began unusually early. To judge from the data on Taiwan and indeed from other developing countries (most of which are at an earlier stage of their fertility decline), this experience is being repeated in many of today's developing countries, although at a greatly accelerated pace. Increases in family limitation and declines in marital fertility seem to be one-way processes that generate their own momentum.

As already noted (Figure 6, page 15), the rise in the *m* index of family limitation in Thailand corresponds with survey data on increasing percentages of married women who practice contraception and this relationship has also been found in Taiwan. Although similar data are unavailable for Sweden and other Western countries at the start of their fertility transition, it is likely that deliberate birth control was also responsible for the shift there. The methods were different, of course. With reliance being placed mainly on withdrawal and possibly abortion, family limitation gained ground much more slowly in Sweden than in Taiwan where efficient modern contraceptives are now readily available. But it is striking that the trend toward terminating childbearing at increasingly earlier ages was nonetheless similar in the two countries.

The family limitation which ushered in the fertility transition represented a radical change in attitudes toward childbearing. Under the natural fertility regime, people did not recognize that fertility could be manipulated. With family size dictated by marriage and physiology, couples accepted, however reluctantly, as many children "as God sends." The transformation that occurred when the fertility decline began was a recognition that couples could aim for specific family sizes and had the capability to act according to these preferences. With the advent of efficient contraception, the rules of the game changed: most women now spend much of their reproductive life trying to avoid excess births. Fertility still varies in the post-transition era but this is usually because some groups are better able to control their fertility than others (the better off frequently practice more effective contraception than the poor, for example) or have different family-size targets (until recently, Catholics in the U.S. desired more children than Protestants).

The innovation of controlling the number of children born rather than leaving it to fate had a wide appeal when it appeared in the Western world. Once some couples in a community had adopted the new pattern of behavior, it became increasingly easy for other couples to follow suit. The cost of going against religious teachings and social standards that had served as barriers to the use of family limitation decreased rapidly as couples became aware that others were violating the old norms. Desired family size itself evolved downward as the advantages of control were increasingly perceived and as methods were developed by which smaller and smaller family sizes could be attained. Once started, the transition could not easily be stopped or reversed; it was a one-way street.

Although levels of marital fertility have fluctuated in Western countries in the post-transition era, these fluctuations have been relatively minor compared to the once-for-all decline. Completed family size dropped from about 7 to 3 children during the fertility transition. The post-World War II American baby boom, on the other hand, represented a movement only from about 3 to 4 children and was by no means a return to less controlled fertility. Parents did not relinquish their capacity to make conscious fertility decisions. Rather, the baby boom was largely the result of a shift upward in desired family size and this was obtained while the average age of mothers at the birth of their last child was still coming down.

Time Concentration and Socioeconomic Context of the Decline

The start of the West's fertility transition was remarkably concentrated in time and occurred under remarkably diverse socioeconomic and demographic conditions.

Contraception in the Roman Empire and in Islamic countries has left literary references but no statistical evidence and it was probably never widespread among married couples. As far as we can tell from recent historical demographic research, systematic contraception to limit family size originated with the French-speaking upper classes. The high nobility of France, the socalled Dukes and Peers of the Realm, are the first social group that can be reliably identified as practicing family limitation. By the end of the 17th century, the average age of women at the birth of their last child was down to the low thirties in this group.[34] At about the same time, the upper bourgeoisie of French-speaking Geneva also appears to have become a highly contraceptive group.[35] Their index of family limitation evolved as follows:

Date of husband's birth	Index of family limitation (*m*)
1550-99	.07
1600-49	.24
1650-99	1.15

By the 18th century, the Italian nobility had followed suit. The English nobility, however, were still untouched at mid-19th century.

Family limitation was widespread in

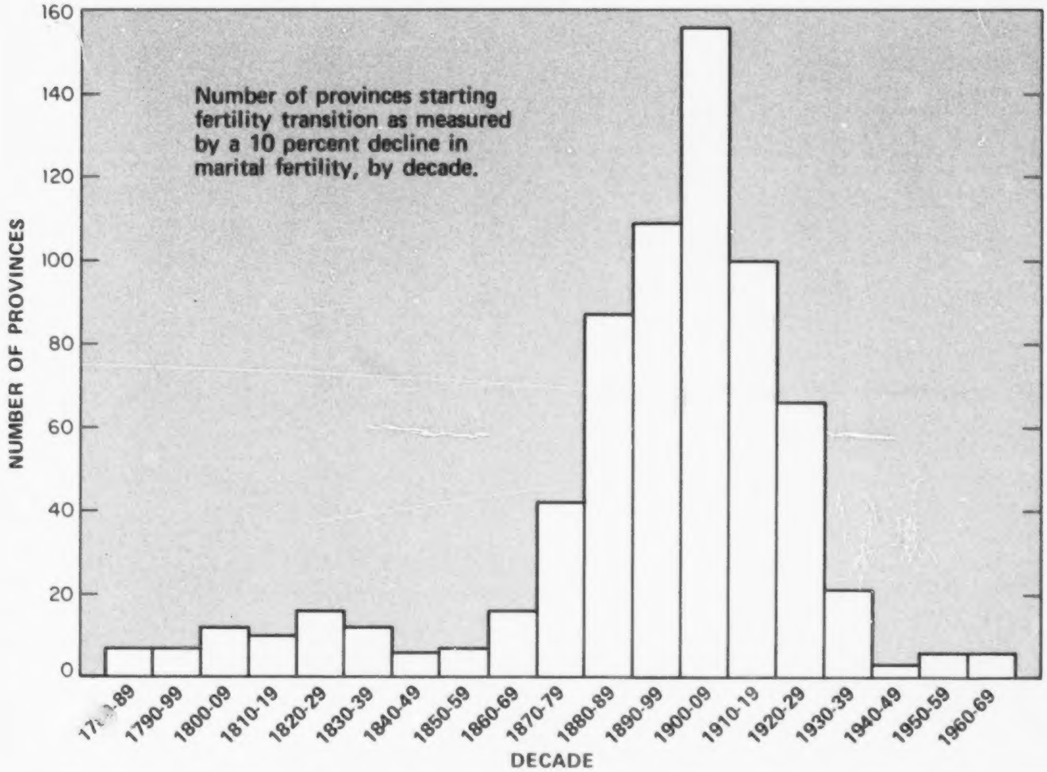
most of rural France by the last quarter of the 18th century, even before the French Revolution. On this, the recent studies confirm the opinion of the French demographer Moheau, writing in 1776, "They cheat nature even in the villages!" In the early 19th century, there were rural spots of family limitation in Germany, Hungary, and perhaps in Sweden and New England. These isolated examples, however, were too unrepresentative to cause clear trends in fertility indices computed from official statistics for entire provinces or countries. Also, there is some evidence that women's physiological ability to bear children was improving during the late 18th and 19th centuries. This tended to mask the impact of the early increase in family limitation on the level of marital fertility.[36] Among countries, only France and the U.S. showed visible signs in the early 19th century of a sustained decline in marital fertility. And it was only beginning about 1870 that the diffusion grew into a pandemic and progressively affected most European countries.

The results of the Princeton European Fertility Project yield estimates of the starting date of the fertility decline for countries and provinces. These are computed from standardized time series of the marital fertility index, I_g, similar to those illustrated in Table 4 (page 18). There were fluctuations during the predecline period of high fertility, but past a certain "point of no return" the fall of marital fertility had clearly begun. The starting date of the decline is put at the year the I_g index had fallen 10 percent below its peak recorded level, never to return again. For example, Denmark's I_g reached 90 percent of its peak level in 1900, just before the 1901 census from which we computed the I_g for around that time. When the 90 percent point was reached between censuses, the estimates were made by interpolation. Thus, for each country, a date was produced which we can presume to be the date when family limitation was established in a substantial proportion of the married population and the effect of the innovation had become cumulative and irreversible. These dates are given in Table 8 (page 32) for 17 European countries where the records extend back far enough and with enough regularity to cover the story from its beginning and also for four developing countries where marital fertility has begun to decline only recently.

Figure 10 shows the distribution of the equivalent dates for the some 700 province-size administrative units of Europe. This clearly demonstrates that the onset of the decline was extraordinarily concentrated in time. The long tail on the left of the graph is accounted for by the long-drawn-out history of marital fertility decline in France. France is characterized not only by its crucial role as the place where family limitation first found a foothold, but also by a wide spread in dates of decline; at the beginning of the 20th century, the *m* index of family limitation was still under .3 in some French departments (provinces). In England, by contrast, the starting date of the decline lay between 1890 and 1900 for almost all the 40 counties and for London as well. The progress of the fertility decline from its early French onset can be likened to a slow-burning fuse that eventually leads to an explosion: more than half of Europe's provinces initiated their fertility decline in the 30 years between 1880 and 1910.

The similarities in starting dates are not limited to contiguous countries in Western Europe. Countries overseas which received very large numbers of migrants at the time of the European transition were infected almost instantly. Demographers John Caldwell and Lado Ruzicka have noted the "extraordinary similarity between the course of birth rates in Australia and the United States, and the similarity between the fertility of these two societies over time and those of Britain, New Zealand, and English-speaking Canada."[37]

Figure 10. Starting Dates of Fertility Transition in 700 European Provinces, 1780-1969



Source: Ansley J. Coale and Roy C. Treadway, "A Summary of Changing Fertility in the Provinces of Europe," paper prepared for the Summary Conference on European Fertility," Princeton, N.J., July 23-27, 1979, Figure 7.

Socioeconomic context of the decline

Table 8 also shows various indicators of socioeconomic development in these 17 European countries at the time their fertility started downward. The most striking finding to emerge from these data is that Europe's fertility decline began under remarkably diverse socioeconomic and demographic conditions. In some countries, family limitation appeared only after considerable industrialization and urbanization had taken place. This was true in England where the rural proportion of the population was down to 28 percent and only 15 percent of employed men were working in agriculture at the time fertility started falling. But fertility began to decline at about the same time in Hungary which was then an overwhelmingly agrarian economy as was France when its transition began about 1800 and Bulgaria at the onset of its decline over a century later. Literacy was also at very different levels when fertility began to fall—low in France, Hungary, and Bulgaria, for example, and high in England and Wales.

There is no evidence that other indicators of socioeconomic development,

Table 8. Starting Date of Fertility Transition and Indicators of Concurrent Demographic and Socioeconomic Conditions: Selected European and Developing Countries

	Date of decline in marital fertility by 10 Percent	Marital fertility before decline (I_g)	Proportion of women married (I_m)	Overall fertility (I_f)	Infant deaths per 1,000 live births
European countries					
France	ca. 1800	.70	.51[a]	.30[a]	185[c]
Belgium	1882	.82	.44	.35	161
Switzerland	1885	.72	.44	.29	165
Germany	1890	.76	.50	.39	221
Hungary	ca. 1890	.63	.70	.45	250
England and Wales	1892	.68	.48	.31	149
Sweden	1892	.71	.42	.31	102
Scotland	1894	.75	.42	.31	124
Netherlands	1897	.85	.45	.35	153[c]
Denmark	1900	.68	.47	.32	131
Norway	1904	.75	.42	.30	76
Austria	1908	.68	.51	.36	205
Finland	1910	.70	.46	.31	114
Italy	1911	.68	.54	.36	146
Bulgaria	1912	ca. .70	ca. .74	ca. .45	159
Spain	1918	.64	.51	.30	158
Ireland	1929	.71	.35	.23	69
Developing countries					
Costa Rica	1962	.89[b]	.50[b]	.57	74
Taiwan	1963	.70	.70	.42	49
Chile	1964	.65[b]	.50[b]	.39	103
Thailand	ca. 1970	ca. .75	.75	ca. .51	77

Source: Etienne van de Walle and John Knodel, "Lessons from the Past: Policy Implications of Historical Fertility Studies," *Population and Development Review*, Vol. 5, No. 2 (June 1979) Table 1, pp. 221-222. Reproduced with permission.

Note: Country borders are of the date of decline. All figures refer to the year estimated as the date of a 10 percent decline in marital fertility except the index of the level of marital fertility before decline. Estimates were obtained by interpolation or extrapolation when data were not directly available for the year indicated.

[a] In 1831.
[b] Excluding consenual unions.
[c] Children dead after registration only.

were they available for comparison, would explain the timing of the decline. Clearly, large differences in the level of development existed among European populations at the start of their fertility transition and it seems safe to conclude that there was no easily definable threshold of social and economic pro-

Percent of male labor force in agriculture	Percent rural[d]	Percent in cities over 20,000 population	Percent illiterate[e]
70	81	7	High
30	56	22	30
33	78	9	Low
38	68	21	Low
73	84	11	49[f]
15	28	57	Low
49	81	11	Low
13	27	49	Low
29	26	42	Low
42	61	23	Low
37	72	18	Low
40	—	19	21
66	85	9	44
46	38	28	39
70	82	7	60
66	45	26	46
48	73	20	Low
58	66	20	14
47	42	31	30
37	29	53	15
75	85	12	18

[d] In communities of fewer than 5,000 or legal definition.

[e] Both sexes, aged 10+ or 15+; high refers to percentages of young adults unable to sign their name on the marriage certificate or of illiterate army recruits, exceeding 50 percent; low refers to percentages under 10 percent.

[f] 6+

gress required for it to begin.

Table 8 also shows infant death rates in the various countries at the time the fertility decline took hold. The increased survival of young children has often been singled out as a decisive factor in influencing parents to reduce their fertility when they come to realize that it takes fewer births to obtain a desired number of surviving children. Table 8 reveals, however, that the fertility decline in Europe began under a wide variety of infant mortality conditions. In many countries the decline in fertility either preceded, or began at the same time as, the decline in infant mortality. Recently, the role of infant mortality in the fertility transition has been thoroughly reappraised.[38] During the 18th century and for most of the 19th century, infant mortality declined slowly in some countries as a result of improved living conditions. But in the last quarter of the 19th century, both marital fertility and infant mortality fell rapidly at the same time. It may be that the ability to determine a target family size through family limitation was a preliminary condition to any real progress in infant and child survival.

The four examples of recent fertility decline in developing countries presented in Table 8 show a diversity in socioeconomic development and infant mortality similar to that of the European countries when their transition began in the 19th century. Thailand, for example, was still 85 percent rural about 1970 when its marital fertility was recorded as having fallen 10 percent below a peak level while Chile was less than 30 percent rural in 1964 when its fertility transition began. However, Chile's infant mortality rate was still at a high 103 deaths per 1,000 live births in 1964, in contrast to the comparatively low level of 49 annual infant deaths per 1,000 live births which Taiwan had reached at the start of its fertility decline in 1963. And in the developing world today, there are still countries that are considerably more industrialized and urbanized and have lower illiteracy and infant mortality than many 19th-century European countries, but where marital fertility has not yet started to decline.

Cultural Factors in the Decline

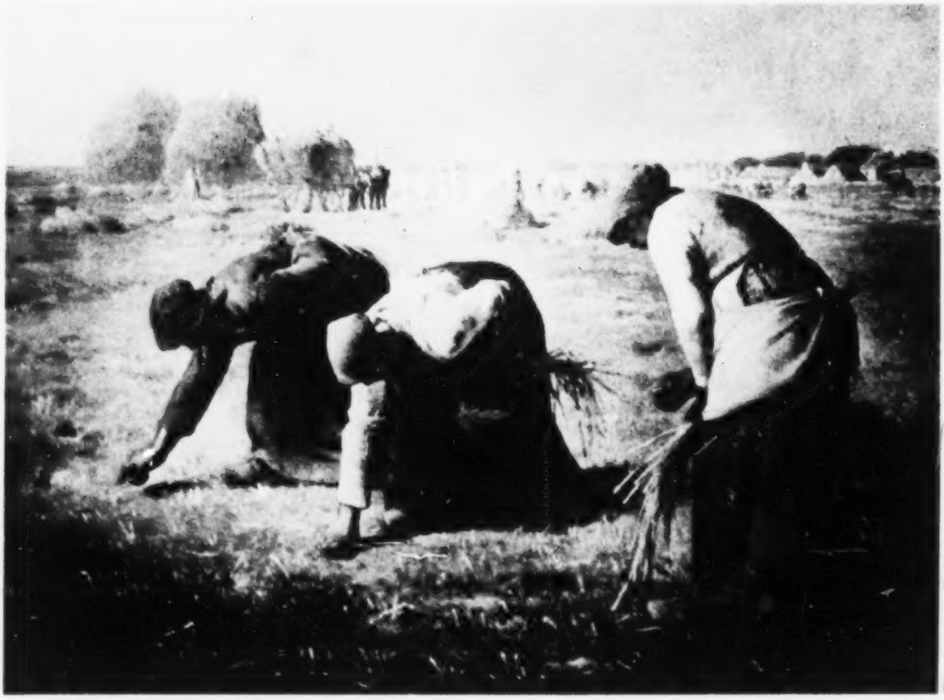
If the simultaneous onset of the fertility decline in European countries is not accounted for by similarity in socioeconomic conditions, then another explanation is in order. We believe that the remarkably grouped timing of the adoption of family limitation in the West can be explained by the cultural setting of countries which shared a means of communication and common standards of conduct. If this is so, the differences in the dates of fertility decline can also be explained by cultural rather than by socioeconomic factors.

A persistent finding of the recent research on Europe's fertility transition is that the onset and spread of the decline seemed to cluster regionally in a way that cannot be explained through similar socioeconomic characteristics. Fertility trends were more alike among provinces within the same region but with different socioeconomic characteristics than they were among provinces with similar socioeconomic characteristics but located in different regions. Common language, religion, or less easily documented customs are typically shared by neighboring provinces within a region whereas cultural boundaries impede the flow of information and the process of diffusion.

A recent analysis of the fertility decline in Russia underscores the importance of culture and tradition.[39] Long-standing cultural traits seem to underlie the persistence to this day of high fertility and the absence of family limitation in the rural populations of Soviet Central Asia, despite many decades of social change, universal primary education, low mortality, and massive indoctrination efforts. Although a direct connection remains to be established, the subordinate position of women, which appears to be an entrenched part of the dominant Muslim culture of the region, is probably a factor.

A striking example of the importance of language boundaries is provided by the two ethnic communities of Belgium. The French-speaking Walloon areas had an earlier and faster fertility decline than the Flemish areas. Moreover, physical proximity was of no importance in places where the two cultures met. An examination of a sample of paired villages, only ten kilometers apart but on opposite sides of the linguistic boundary, reveals that although there were no significant social and economic differences between them, the language border constituted "a real demarcation line between two obviously non-interacting demographic regimes."[40] In England, by contrast, a close communication network, combined with cultural homogeneity, made for almost simultaneous acceptance of family limitation throughout the country despite widely varying levels of urbanization and economic development.

The diffusion of the idea of family limitation was an essential component of the fertility transition, and best explains such characteristics as its suddenness, irreversibility, and simultaneity. If diffusion was involved rather than independent invention of family limitation by individual couples, stimulated by socioeconomic change, then the ease of communication within a cultural sphere is an important factor in the timing and pace of the fertility decline. It is probably wrong to assume that the decline was triggered by the transfer of information on birth control techniques or actual contraceptive devices. Some diffusion of techniques clearly occurred among interested couples but this would have been too secretive and too subject to censure to have been responsible for the very fast drop of fertility in millions of individual families. The decisive factor was probably the spread of a new mentality—an openness to the idea of manipulating reproduction, a new willingness to explore methods of fertility control, or the new acceptability of already available methods which previ-



The Louvre, Paris

"The Gleaners" by Millet. French peasants were forerunners in family limitation.

ously seemed scandalous, uncouth, or threatening to the sexual prerogatives of the male.

What happened in England is most often cited as evidence of this diffusion process. There, in 1877, Charles Bradlaugh and Annie Besant decided to reissue a pamphlet entitled *The Fruits of Philosophy* written 44 years before by an American, Dr. Charles Knowlton, advocating douching as a contraceptive method. Until then, the pamphlet had been selling at an average of a few hundred copies a year; now the authorities unaccountably decided to prosecute for its publication and sale. Bradlaugh and Besant meant their action as a deliberate provocation, and the publicity attending their trial fully justified their expectations. They were given a national tribune to state the case for family limitation and some 125,000 copies of the pamphlet sold in three months. Hower, it is pointed out, the trial may have been only a conspicuous episode in a movement that had already begun:

"The extensive publicity which the press had unwittingly provided brought the idea of contraception vividly to the minds and thoughts unaffected by the earlier propaganda. . . . If the trial can with truth be said to have jolted the nation into a new awareness of the birth control doctrines, its influence must not on that account be overemphasized. The fact that the reports of the proceedings found a public in some respects already prepared would suggest that forces other than the trial itself were at work to modify traditional beliefs. For this reason the widespread publicity given by the press may be more correctly regarded as the accelerator of a process already begun than as an indication of social change."[41]

Thus "birth control doctrines" were diffused if not necessarily the particular method (douching) advocated by Knowlton. And since family limitation was spreading at that very time all over Europe, the tremor attending the Bradlaugh-Besant trial must have been more a symptom of the timeliness of the idea and of the receptiveness of the public than a main factor in spreading the doctrines.

The diffusion occurred within an existing social framework and encountered resistance from the established powers of the day. In the Bradlaugh-Besant case, the resisters were the English judiciaries. Later, as the 20th century began, the U.S. Post Office assiduously hunted down birth control propaganda as "lewd and obscene." Everywhere the political, moral, and religious defenders of motherhood and apple pie condemned birth control as scandalous and deplored the decline in family size—at least in public. Hypocrisy and double standards were common even after the transition was well under way. At the time the 1921 French law prohibiting birth control propaganda and the sale of contraceptives was passed, an opposition newspaper pointed out that members of the French National Assembly who voted for the law had themselves overwhelmingly opted for small families.

The identification of social and cultural indicators that reflect a receptivity to family limitation has lagged behind the measurement of more readily identifiable socioeconomic characteristics. Nevertheless, such hard-to-measure factors as changes in the status of women, secularization of attitudes, and the rejection of societal traditions in favor of individual interests may have played a more important role than socioeconomic factors in setting off the West's fertility transition.

Lessons for Today's Developing Countries

There is universal agreement that the demographic transition is now under way throughout today's developing world in that death rates have fallen virtually everywhere. Although generally the rates still compare unfavorably with those of developed countries, the improvements that have occurred, especially since World War II, are truly spectacular compared to any past experience. In most developing countries, mortality has declined far faster than it did in the West, but in both cases the process has been largely irreversible, at least to date.

The focus of this *Bulletin*, however, is on fertility decline and here there is less agreement concerning the path the Third World is following. In almost all developing countries, birth rates are still higher, and often substantially so, than they are in developed countries. In 1977, birth rates still averaged 35 per 1,000 population in Latin America as a whole, for example, and 46 per 1,000 in Africa, compared to 12 in Western Europe, 15 in the U.S. and Japan, and 18 in Eastern Europe.[42] However, there is mounting evidence that fertility has begun to fall in an increasing number of developing countries.[43] And, as with mortality, this decline once begun is often far more rapid than it was in the West.

Thus the demographic transition appears to be maturing in a substantial number of developing countries and doing so at a pace unprecedented in the historical experience. Still there are enough developing countries where fertility has shown little or no trend toward sustained decline to leave open the question of whether they will necesarily follow the pattern of the past. Indeed, questions can be raised about whether even the recent mortality declines in these countries can be sustained much longer in the face of deteriorating living conditions caused by the rapid population growth which stems from the current imbalance between low death rates and high birth rates.

Differences and similarities

There are differences between today's developing countries and Western countries prior to their fertility decline that are far from trivial and their implications for the demographic transition in the Third World should not be minimized.[44] In Western Europe especially, population growth rates (the difference between birth and death rates) never came close to the staggeringly high levels that have characterized many less developed nations in the past two or three decades. The reason for this important difference is two-fold. First, although marital fertility during the predecline period was as high in the West if not higher than it has been for today's developing countries, overall birth rates were substantially lower due to the late age at marriage and large proportions who remained permanently single. Second, since death rates did not decline as fast, they were generally higher in the West at equivalent stages of the demographic transition than they are or have been in less developed countries. For example, in Sweden in 1855, about 40 years before its long-term fertility decline began, the birth rate was 33 per 1,000 population and the death rate 22 per 1,000. This makes for an annual growth rate of 1.1 percent—a rate at which a population doubles in 63 years. For Taiwan in 1953, ten years before the 1963 date established for the onset of its fertility transition (see Table 8), the birth rate was 45 and death rate 9 per 1,000.[45] The resulting 3.6 percent growth rate, if continued, would have doubled Taiwan's population in just 19 years. The unique marriage pattern which kept predecline fertility moderate was crucial to Western Europe's preindustrial demographic situation and was itself a product of social and economic norms which are generally not found in Third World countries today.[46] Despite these and many other important differences, however, we believe there are fundamental features of Europe's historical fertility decline that are relevant to understanding the current situation in less developed contries and particularly to judging the potential contributions of family planning programs in precipitating or accelerating fertility decline.

To recapitulate these features. They include the variety of social, economic, and demographic conditions under which Europe's fertility transition took hold; the remarkable concentration of the starting dates; the absence of deliberate birth control within marriage before the decline despite evidence that a substantial proportion of births were unwanted; the apparent coincidence of the decline with the sudden adoption of family limitation practices; the rapid spread of such practices, once they appeared; the resultant drastic change in reproductive behavior; the irreversibility of the process once under way; and, finally, the importance of cultural factors among those that appeared to influence the onset and spread of the fertility decline. These same features can be identified in many less developed countries today.

Fertility has already fallen decisively in Third World countries at quite different levels of development (at least as measured by conventional socioeconomic indicators). They include not only the relatively well educated and completely urban city states of Hong Kong and Singapore, and countries with spectacular economic success such as Taiwan, but also countries with more moderate economic growth that remain predominantly rural, such as Thailand and even Indonesia which is clearly among the poorest nations in the developing world. The onset of these fertility declines is also quite concentrated in time; many began in earnest only during the last decade and a half. Thanks to a large number of sample surveys, we have direct evidence for many of these countries that birth control knowledge was lacking in the predecline period.[47] The surveys also indicate that desired family size was often below the actual number achieved which suggests that much fertility was unwanted. Further, the surveys document the rapid and apparently irreversible adoption of birth control within marriage in these countries once it starts to be practiced by any sizable proportion of couples.

As we have already seen in comparing Taiwan with Sweden (Figure 9, page 27), reproductive behavior is being transformed in many present-day developing countries through the same process of family limitation as in the West. The same irreversible increase in family limitation is evident in both countries and, as with Sweden, a steady reduction in marital fertility has accompanied the increasing practice of family limitation in Taiwan. The striking difference is not in the trend but in the pace. Just as mortality declined far faster in developing countries than in the West, the shift from high to low fertility and the accompanying transition from natural fertility to family limitation, at least where it is now taking place, are occurring at a speed unprecedented in the past. The process is similar; the pace is different.

Also like the West, cultural boundaries seem to dictate the onset and spread of fertility decline in the Third World. This is true both on an international basis and for ethnic communities within the same nation. Moslem and Sub-Saharan African countries, for example, typically lag behind other less developed countries in fertility decline even after other relevant factors are taken into account.[48] In Singapore and Malaysia, birth rate declines began later among Malays than in the ethnic Chinese and Indian groups. However, in Singapore, the lag was only from 1958 to 1965.[49] Thus, again, the underlying process seems similar but the pace faster.

Policy implications

Given these similarities between the past and present fertility declines it seems appropriate to ask what implications for population policy in Third World countries can be drawn from the historical record. One finding we have stressed is that there is only a loose relationship between the level of socioeconomic development and fertility decline. Although a relatively high level of development may often accompany a fall of fertility, it is clearly not a precondition. Thus, the introduction of a family planning program in a developing country at an early stage of development does not necessarily foreclose its success. After all, the initiation of fertility decline based on voluntary use of relatively inefficient means of fertility control occurred in some European populations at a time when their level of socioeconomic development was remarkably low.

A related finding is that there appears to have been an important innovation-diffusion dimension to the reproductive revolution that swept the West. If family limitation was an innovation in Europe when the fertility transition began and its diffusion contributed to the pace of fertility decline there, the same process can occur in developing countries today, where family planning also represents a new type of behavior. Organized family planning programs that provide both information and services, as well as propaganda efforts designed to legitimate family planning practices, may well help initiate or accelerate the adoption of these practices. The "legitimation" function of a government or privately sponsored program may be of considerable importance if existing birth control techniques are primarily associated with extramarital sex, as they appear to have been for a long time in Europe and reportedly still are in some less developed countries today. Moreover, given the modern communications now existing in much of the developing world, the potential for rapid diffusion of birth control practice is considerably greater than it was historically.

The irreversibility of the spread of family limitation and the decline of fertility in the past clearly contradicts the assumption sometimes made that family planning programs in today's developing countries can only skim the cream off the top and that, after initial success, demand for their services will dry up.[50] The historical record suggests that, once started, the decline of fertility does not easily stop.

If it is true that women in pretransition Europe would probably have been more receptive to birth prevention than their husbands, then the methods of birth control available are also of some importance. The argument that withdrawal is always an option not only ignores the real possibility that it may be unknown or culturally unacceptable, but also overlooks the possibility that it may be the wife who is most interested in preventing births. The fact that a variety of modern methods are promoted by family planning programs today, including many female methods, such as the pill, IUD, injection, and tubal ligation, should contribute to an acceleration of fertility decline.

Whether or not a family planning program will meet with success will be determined by how receptive couples are to the idea of reducing their fertility once the knowledge and means of birth control are available. The absence of practice prior to campaigns to disseminate information and services does not necessarily indicate the lack of such receptivity. It may instead reflect an unfamiliarity with the concept and methods of family limitation.

Unfortunately, our knowledge of what determines couples' receptivity during the early stages of the transition to low fertility is quite incomplete. It seems reasonably clear that is is only loosely linked to the level of socioeconomic development as conventionally defined. Thus the mere attainment of a certain threshold of socioeconomic development appears an uncertain predictor of the trend of fertility. Apparently the level of development necessary to provoke a change in reproductive behavior is so variable that there is no telling, except after the fact, whether modernization was advanced enough for fertility to decline. Thus, the historical record provides little assurance that efforts to reduce fertility or hasten a decline through raising the level of socioeconomic development will meet with early success.

UNICEF photo by Na Pombejr

A family planning fieldworker makes her rounds in Thailand where fertility has fallen decisively although the country is still predominantly rural.

One of the more important implications of our interpretation of the historical record, then, is that current recommendations to shift the emphasis away from family planning programs and toward development efforts as a means of reducing fertility should be viewed with considerable caution.[51] Stressing the importance of general development programs or the selective restructuring of such programs at the expense of programs aimed at disseminating both knowledge and methods of birth control is politically popular at the moment.[52] Our interpretation of the historical record, however, casts doubt on the assumption that such shifts in policy will often be expedient in hastening declines in birth rates. In many cases a greater payoff might well result from concentrating efforts on improving and extending existing family planning programs.

Of course, it would be unrealistic to

assume that either family planning programs or development efforts designed to influence fertility will be successful everywhere immediately, especially if no attention is paid to the long-established cultural values regulating fertility in specific societies. While family planning programs may elicit a very favorable response in some populations even at quite low initial levels of development, in others we might expect such efforts to be quite unsuccessful at considerably higher levels of development. Under the latter circumstances, it is hard to be optimistic about the potential of either organized family planning or general development efforts for lowering population growth until these cultural barriers are broken down. Family planners would be offering their message and wares to an unreceptive, even, perhaps, largely inaccessible audience (particularly in situations where women's roles are highly segregated and male domination is extreme), whereas general development programs would be most likely to increase population growth by reducing mortality while fertility remains high.

Unfortunately, there is very little firm knowledge concerning the cultural factors that have facilitated the acceptance of family limitation. However, we believe the historical record suggests that special attention should be paid to those cultural features that determine the status of women and their ability to assert their own wishes regarding childbearing. In cultural settings where the female role is subordinate to the extreme and where women are isolated from the broader communication network, policies designed to alter the status of women may be more conducive to reduced fertility than either family planning alone or more general development efforts.

Finally, the historical evidence suggests that high infant and child mortality may have been as much a reaction to high fertility as vice versa. If, in the absence of birth control, dissatisfaction with excessive fertility led to significant numbers of infant deaths through neglect or abusive child care, this suggests that high infant and child mortality rates are not necessarily contraindications to readiness for family planning programs, as has been generally assumed. Indeed, just the opposite may be true.

It would be foolish to expect that all or most of the critical policy issues of today can be effectively addressed by looking into the past experience of the West. For example, the success of organized family planning efforts depends on such programmatic factors as program content, strategy, organization, and administrative structure—factors about which the historical record cannot tell us much since the fertility transition in the West occurred while most governments, rather than enacting programs to encourage fertility decline, remained staunchly pronatalist. Nevertheless, the richness of the findings emerging from the large number of in-depth studies of the historical fertility experience now under way is impressive and we have far from exhausted their implications for current policy. Not everyone will agree with the implications we have drawn. However, we hope we have made clear that recent research has not only expanded our knowledge of the historical fertility transition of the West, but has also provided us with a valuable perspective for the study of the demographic changes that have only begun in much of the rest of the world. □

Footnotes

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Population Bulletin

America's Baby Boom Generation: The Fateful Bulge

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Abstract—Nearly 42 million births occurred in the U.S. from 1955 to 1964, a ten-year record unequaled to then and unlikely soon to be repeated. This *Bulletin* explores the baby boom's roots and lasting impact on U.S. society—an impact accentuated by the phenomenon's unexpected interruption of a century-long fertility decline and the relatively small sizes of the preceding Depression and following "baby bust" birth cohorts. Large families explain less of the baby boom than commonly thought. Demographically, the main cause was a near-universal rush into early marriage and formation of families of at least two children. This was fueled by favorable economic conditions for the relatively scarce young men of the Depression cohort then entering the job market and a revival of pro-marriage, pronatalist norms long present in U.S. culture. To accommodate the outsize baby boom cohort, school and college facilities expanded enormously in the 1960s and early 1970s and are now too abundant for the current school-age baby bust cohort. Similarly, unemployment and crime rates rose and subsided with the passing of the baby boomers through late teenage and early adulthood. In the 1980s, with the bulk of baby boomers aged 20-30, housing demand will remain high and annual birth *numbers* will increase even if the *rate* of childbearing hovers below replacement level at about 1.8 births per woman as it has since 1974. Per capita earnings and overall labor productivity should improve as the baby boom cohort settles into experienced middle age in the 1990s, although advancement chances will be limited for the cohort's members. U.S. society's greatest baby boom challenge will come as the cohort reaches retirement age; the 65-and-over population will nearly double from 31 million in 2000 to almost 60 million in 2030. The ratio of active workers paying into the Social Security pool (the baby bust cohort) to elderly beneficiaries will fall drastically although the burden will be offset somewhat by reduced proportions of young dependents under age 18.

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America's Baby Boom Generation: The Fateful Bulge

By Leon F. Bouvier

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POPULATION BULLETIN
Vol. 35, No. 1, April 1980

America's Baby Boom Generation: The Fateful Bulge

By **Leon F. Bouvier**
Select Commission on Immigration
and Refugee Policy

Dr. Bouvier, a former vice president of the Population Reference Bureau, is presently consultant in demographic analysis to the PRB. He also serves as demographic advisor to the U.S. government's Select Commission on Immigration and Refugee Policy while on detail from the Bureau of the Census. Previously he was a senior researcher with the Select Committee on Population of the U.S. House of Representatives. His publications include Socio-Religious Factors in Fertility Decline *(with S.L.N. Rao, Ballinger Press, 1975) and the forthcoming textbook,* Population: Demography and Policy *(with Robert H. Weller, St. Martin's Press, 1981). He is also author of numerous articles in professional journals on a wide variety of demographic topics.*

Dr. Bouvier acknowledges the indefatigable assistance of PRB Director of Publications Jean van der Tak in the preparation of this Bulletin. *Mary Barberis, Carl Haub, and Elaine Murphy of the PRB staff also merit a heartfelt thank-you for having read through the manuscript and for making valuable suggestions, many of which were incorporated in the final version.*

Seldom does a day or week go by without the media—be it radio or television, newspapers or magazines—making reference to the "baby boom" and its impact on some aspect of U.S. society. Indeed, when it comes to U.S. population matters, the concern of a decade ago over population growth itself now appears to have shifted to anxiety over changing age patterns or the population's "age distribution." Changes in the proportion of people in various age ranges are by and large the results of changes in fertility. And it was changes in fertility that brought about the post-World War II baby boom cohort and its smaller neighboring cohorts, the Depression cohort of the 1930s and the "baby bust" cohort of the 1970s.*

This *Bulletin* focuses on the baby boom cohort or generation—its causes, its size, and most importantly, its impact on society. As it moves through life, this swollen generation creates a bulge in the U.S. population age distribution that demographers have likened variously to "a goat (or a watermelon or a pig or an elephant) passing through a boa constrictor (or a python)." "Much of our recent and future history will consist of this giant generation passing through infancy, youth, the middle years and old age," says Harvard University demographer William Alonso.[1]

The baby boom seems "explosive" only because the preceding and following cohorts were relatively small. To get a better perspective on the baby boom's impact, all three generations must be analyzed. Hospitals that rushed to accommodate soaring numbers of births in the 1950s were caught with empty maternity wards as births began to subside in the mid-1960s. Elementary schools and then high schools in their turn went through similar boom and bust sequences. And now in the 1980s, universities are being left with an oversupply of just-completed buildings and tenured faculties as the baby boomers begin to move out of the 18-24 age bracket.

---

*A cohort consists of all the people born within a stated relatively short period, e.g., five or ten years.

The aging of the baby boomers followed by the thinner ranks of the baby bust generation promises some good things. The high juvenile-delinquency, crime, and unemployment rates of the late 1960s and 1970s should come down as teenagers dwindle in number in the 1980s. Inflation fueled by the soaring demand for housing should abate as the peak of the baby boom generation leaves behind the 20-30 household-formation ages. But off in the 21st century lurks the crunch that could come as this generation begins to retire and the smaller following cohorts are left to finance their Social Security benefits.

What Was the Baby Boom?

In many ways, the baby boom was like a sonic boom, so startling was this unanticipated fertility increase. Simply stated, the baby boom was a "disturbance" which emanated from a decade-and-a-half-long fertility splurge on the part of American couples. This post-World War II phenomenon upset what had been a century-long decline in the U.S. fertility rate. Upon completion of this extraordinary period of family formation, the fertility rate once again resumed its long-term decline and recently attained a record low point.

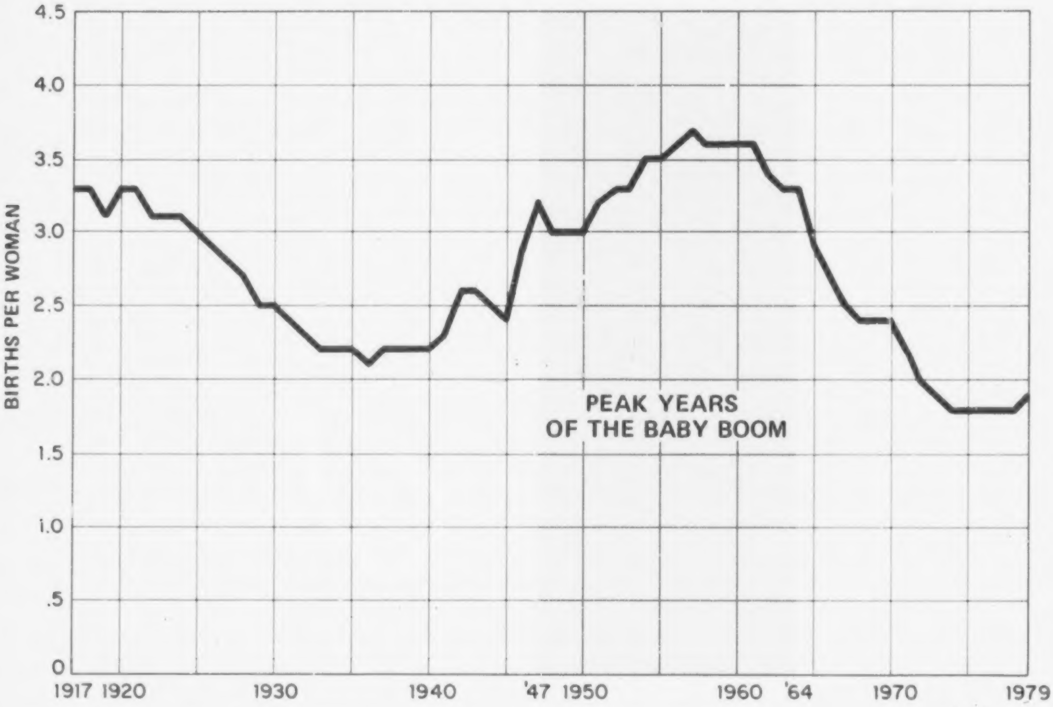
A few other countries also participated in this fertility rite. Canada's fertility trends and those of Australia and New Zealand are remarkably similar to the experience of the U.S. But the phenomenon did not occur in the developed countries of Western Europe, nor in the centrally-planned nations of Eastern Europe. In most instances, fertility increased for a few brief years after the end of World War II and then returned to the low levels prevalent prior to the war.

U.S. demographers were caught short. Most were prepared for a brief postwar spurt in annual births but not the protracted surge that followed. Indeed, in the 1940s, demographers were predicting that the U.S. population would soon stop growing at a size far below the numbers we now have. Demographers Warren Thompson and Pascal Whelpton predicted in 1943, for example, that the 1970 figure would be 157 million and that the nation's population would peak at 161 million in 1985 and then begin to decline.[2] The figure in 1970 was, in fact, 204 million and in 1985 is likely to be 230 million and still growing at close to 2 million a year.

The mistaken forecasts of the early 1940s were based on more than simple extrapolation of past trends. They stemmed also from what was then (and still) accepted sociological theory. With increasing urbanization and "modernization" would come a shift from a traditional to a rational way of life. And with a rational way of life, it was held, women would be freed from the bondage of the home, individualism would flourish, family functions would be taken over by specialized institutions, contraception would become universal, and large families would be relegated to the past.

Contrary to popular opinion, the baby boom did *not* represent a return to the large family of the 19th century. What actually happened, as demographer Charles Westoff puts it, was "a movement away from spinsterhood, childless marriage and the one-child family, and a bunching together of births at early ages. Only a minor part of the baby boom can be attributed to increases in the proportions having three or more births," he claims.[3] The pro-

Figure 1. Total Fertility Rates for U.S. Women: 1917-1979



Sources: 1917-75: Selma Taffel, *Trends in Fertility in the United States*, Vital and Health Statistics, Series 21: Data from the National Vital Statistics System, No. 28 (Hyattsville, Md.: National Center for Health Statistics, 1977) Table 13; 1976-77: U.S. Bureau of the Census, *Statistical Abstract of the United States, 1979*, Table 82; 1978: U.S. Bureau of the Census, "Population Profile of the United States: 1978," *Current Population Reports*, Series P-20, No. 336, Table 3; 1979: National Center for Health Statistics, Natality Division, personal communication, April 1980.

portion of women having at least two births rose from 55 percent in the 1930s to 85 percent in the 1950s.[4] However, the average number of children that women actually had altogether rose only from a low of 2.3 apiece (for women born in 1908) to about 3.2 (the "completed family size" that the Census Bureau calculates women born in 1935 will have averaged by the time they reach age 50).[5]

When Was the Baby Boom?

To pinpoint the period of the baby boom, both the rates and numbers of births must be considered. If we are interested in fertility behavior—the annual number of births per woman—the rates are the crucial indicators; if we are interested in societal impacts of different cohorts, then the number of births occurring in a given year is more meaningful.

To trace 20th century trends in U.S. fertility rates, we use the total fertility rate (Figure 1). The total fertility rate of a given year indicates the number of children that would be born to each woman in a population during her lifetime if each were to have children throughout her childbearing years (considered ages 15 through 44) at the same rate as women of those ages actually did in that year. It is not the same as the average completed family size, mentioned above—the number of children that women of a particular cohort *actually* had on the average by the time they

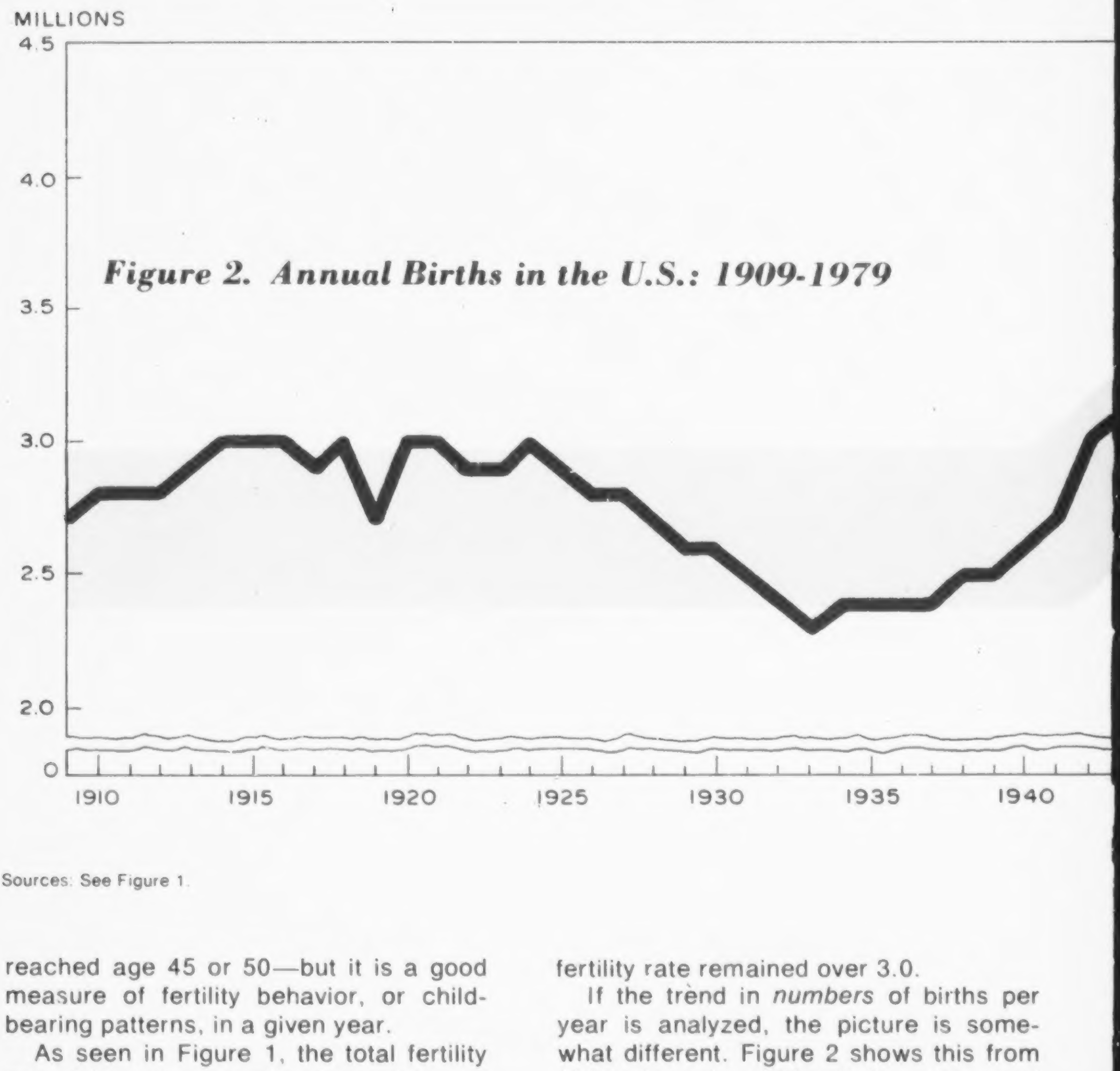


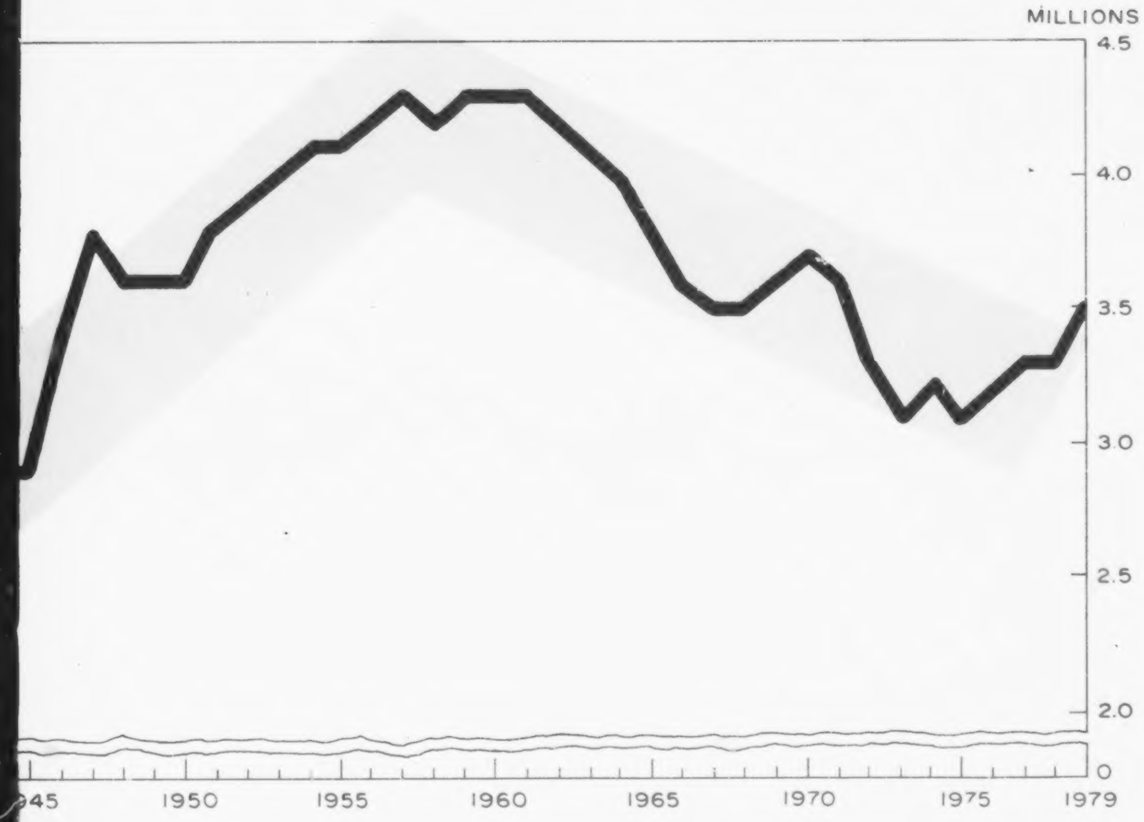
Figure 2. Annual Births in the U.S.: 1909-1979

Sources: See Figure 1.

reached age 45 or 50—but it is a good measure of fertility behavior, or child-bearing patterns, in a given year.

As seen in Figure 1, the total fertility rate fell quite steadily from 3.3 per woman in 1917 to 2.1 in 1936 (with a dip during the influenza epidemic year of 1919). This was followed by a slight rise to 1943, another dip, a sharp rise in 1947 to 3.2, a leveling off to 1950, and then a dramatic increase to a peak of 3.7 births per woman in 1957. A gradual but steady decline then began and with slight modifications has continue to the present day. (The estimated 1979 rate was just under 1.9, up slightly from about 1.8 in 1978.) If *rates* are the criteria for determining when the baby boom occurred, one could say, 1947 through 1964—18 years when the total fertility rate remained over 3.0.

If the trend in *numbers* of births per year is analyzed, the picture is somewhat different. Figure 2 shows this from 1909 through 1979. Unlike the total fertility rate, annual numbers of births showed little variation before World War II. Indeed, the total in 1941 was the same as in 1909 (2.7 million). In the 37 years from 1909 through 1945, the average annual number of births was 2,747,000. In only six of those years did the number vary by more than 10 percent from that average. Twice it just cleared 3 million—in 1921 shortly after World War I and in the World War II year of 1943. During four Depression years (1933 through 1936) births fell below 2.4 million. Otherwise, annual births were extraordinarily stable



throughout the 37-year period.

After 1945, the number of annual births jumped remarkably. A million more births took place in 1947 than in 1945 and for the next 17 years the annual average was 4,035,000. At no time did the annual total vary by as much as 10 percent from that average. While the peak year was 1957 (as it was for the total fertility rate) when more than 4.3 million births were recorded, the number of births was greater from 1955 through 1964 than it had been between 1948 and 1957. In the 1955-64 decade, nearly 42 million births took place—the most ever recorded in the U.S. in any ten-year period. By the mid-1970s, births had fallen to just over 3 million per year, only slightly higher than in the early 1940s. (The total climbed back to 3.5 million in 1979.) In looking at numbers of births, then, one could say that the baby boom period was concentrated from 1954 through 1964 when over 4 million births occurred each year.

For practical reasons, in this *Bulletin*, we will rely on conventional decades to define our cohort dimensions. The baby boom, while it lasted from 1947 to 1964, will be treated as the decade of the 1950s (1950-59), implicitly accepting some spillover at both ends of the decade. The Depression cohort are the people born in the 1930s (1930-39). The baby bust cohort is that of the 1970s (1970-79). The intermediate decades are transition periods; the 1940s being on the rise toward the baby boom; the 1960s being on the decline to the baby bust.

Reasons for the Baby Boom

Any attempt to explain the baby boom must turn to several types of reasons: economic, sociological and psychological, as well as demographic. Labeling the phenomenon the "post-World War II baby boom" suggests erroneously that its prime cause was the end of hostilities when troops returned home, some to their wives and others to fiancees. Marriage rates skyrocketed immediately after the war (as did the divorce rate) and family formation was hurried to compensate for years of separation. This explains the first very short period of high fertility as it does the postwar boomlet in European countries. But after the spurt of 1947, both the rate and number of births fell off for the next three years. It was not until 1951 that the real baby boom got under way. Postwar family reunification and/or formation does not explain the high fertility that lasted for well over the next decade. As Donald Bogue notes, "the peak rate [in 1957-59] was achieved 11 to 13 years after military demobilization and the other dislocations associated with World War II."[6] Reunification after the Korean War which drew over six million American men away from home in 1950-53 could well have contributed to the soaring fertility of the mid-1950s, but that too was over long before the baby boom subsided.

Demographic factors

As noted, a dramatic rise in large families does not explain the baby boom, although the proportions of women having three or more children did rise. For example, close to 60 percent of women born in 1935 who were in the prime childbearing ages during the baby boom had had three or more births by the time they were 39 compared to just 32 percent at that age among Depression cohort mothers born in 1908.[7] Demographically, however, the primary causes of the baby boom were more people marrying and having at least two children at earlier ages, and also what may have been some "makeup" births among older women who were previously childless. The total fertility rate did remain above 3.6 per women from 1956 to 1960—extraordinarily high for a developed nation and 60 percent higher than that recorded in 1940. But the total fertility rate is a synthetic measure which is affected by the *timing* of births. No cohort of American women born in this century has actually had an average of that many births per woman.

This timing peculiarity is revealed in the total fertility rate for *first* births among white women during the baby boom. Between 1947 and 1957, that rate was almost always above 1, indicating more than one first birth per woman—clearly an impossibility for any real cohort of women. This anomaly reflects the overlapping of two age patterns of childbearing. First-birth rates were very high for older women as well as for younger women during this period.[8] Older women were also rushing into motherhood, but it was the younger women who made the most difference.

For them, marriage came sooner than it had for their mothers or would for their daughters. In 1956, women's median age at first marriage stood at just over 20—down from 21.3 in 1930. In other words, half of all women marrying for the first time in the early part of the baby boom were teenagers. In 1960, at the height of the baby boom, nearly three-quarters (71 percent) of women aged 20-24 were or had been married compared to barely half (51 percent) 19 years later in 1979.[9]

Babies came sooner and faster. Half of the first births to women who married between 1955 and 1964 came within 15 months after marriage, an interval only about half as long as that for women married during the 1930s (25 to 26 months) or those married in the early 1970s (27 months).[10] And during the

JUST MARRIED

Marriage was popular and early during the baby boom era.

1950s, women had their second births by age 24.7 on the average—down from age 27.1 in the 1930s.[11] Childlessness was also much rarer. In a 1975 national survey, only 8 percent of women who had married during the heart of the baby boom, 1955-64, reported themselves as still childless, compared to 16 percent of those married in the 1930s.[12]

What caused this headlong rush into marriage and parenting among young American women—behavior so different from that of their mothers a generation earlier and their daughters now?

Economic causes

For some economists, the answer seems straightforward. The U.S. economy expanded rapidly after World War II, first carried along by the stimulus of the war itself and later by the enormous expansion in transportation, housing, and government spending associated with the growth of metropolitan areas. Demand for labor was high and the supply available to fill it—young people age 15-29 just entering the job market—came from the relatively small birth cohort of the 1930s. Younger workers also enjoyed an advantage over older workers because secondary schooling had expanded rapidly between 1920 and 1940. Thus encouraged by good jobs with relatively high wages and the prospects of rapid promotion, young men were quick to marry and start families. The GI bill and Veterans Administration financing for housing also made it easy for veterans to get an early start at family-building. Young couples swarmed to the expanding suburbs with their three-bedroom homes, each with a private lot safe for small children. Further, raised in the relative deprivation of the Depression years, these young couples had not developed "tastes" for such luxury consumer items as a second car or a summer home. Extra income might well go into an extra child or two.

Economist Richard Easterlin, a leading proponent of this explanation for the baby boom, sees this same set of conditions, but this time in reverse, operating to explain the downturn in fertility during the later 1960s and 1970s. But by the late 1980s young adults (the forerunners of the baby bust generation) will again be relatively scarce, thus boosting the job and earnings opportunities of young men relative to older male workers over what they were for their baby boom counterparts. And this will touch off another round of early marriage and family formation and a rise in the birth rate, Easterlin predicts.[13]

Sociological causes

Sociologists have a different explanation for the baby boom. For them the key lies in pervasive pro-marriage, pro-housewife, and pro-natalist forces that have always been woven into American culture and which somehow resurfaced after the Depression years and World War II when young women had gone to work—and college—in large numbers and at least dreamed of having a career. Betty Friedan called it the "feminine mystique" in her 1963 book that helped fertilize the rebirth of feminism in the U.S.—the women's liberation movement.

Describing women's lives in the 1950s, she wrote:

> ". . . kitchens were once again the center of women's lives. . . . Girls were growing up in America without ever having jobs outside the home [and although] a third of American women now worked, most were no longer young and very few were pursuing careers. They were married women who held part-time jobs, selling or secretarial, to put their husbands through school, their sons through college, or to help pay the mortgage. Or they were widows supporting families. Fewer and fewer women were entering professional work. Shortages in the nursing, social work, and teaching professions caused crises in almost every American city. Concerned over the Soviet Union's lead in the space race, scientists noted that America's greatest source of unused brain-power was women. But girls would not study physics: it was "unfeminine." A girl refused a science fellowship at Johns Hopkins to take a job in a real-estate office. All she wanted, she said, was what every other American girl wanted —to get married, have four children, and live in a nice house in a nice suburb."[14]

The "feminine mystique" that lured almost all women into early domesticity and parenting was the conviction that the proper and only truly fulfilling role for a woman was as wife and mother. Parenthood is also a precondition for the male role, this view holds, but as a father, the male is primarily a complement to the mother—"extra-familial, protective, economically supportive."[15] Women's magazines spread the revived gospel of parenting and "togetherness." Freudian psychology, sociological "functionalism," and Margaret Mead provided the scientific underpinnings.

Freud's influence was rising to a crescendo in the 1940s and 1950s and Freud had believed that women were compelled to compensate for the lack of a penis by having children. As demographer-sociologist Judith Blake puts it:

> "Freudian psychology, from Freud to Deutsch to Erikson, is invariant in its insistence that the reproductive capacity must be actualized for the woman to approach mental health. Motherhood is what women do and they should not be encouraged to embark on social roles that conflict with the realization of their basic psycho-biological needs."[16]

Borrowing from biology and based on observations of primitive societies, social scientists in these years also began stressing that the proper functioning of the family—its "reproductive efficiency"—required that women assume the internal, nurturing role and men a task-oriented, external, supportive role. Family-life education became the fashion.

So did Margaret Mead Ironically a leader in the later "feminine protest" and a profound influence on American women for three generations, Margaret Mead was an early functionalist. "Glorification of women in the female role, as defined by their sexual biological function" permeates her prolific writings beginning with *Coming of Age in Samoa* in 1928, although this is often confounded by the opposite message that "woman's potential is as great and various as the unlimited human potential."[17] The theme is most pervasive in *Male and Female*, published in 1955, her book which Friedan calls "the cornerstone of the feminine mystique."[13]

Unwanted fertility

Another reason for the baby boom often given by demographers is the ambivalence of couples toward preventing that "extra" third or fourth child and consequent carelessness or inefficiency in practicing contraception.

We now know that large families were less common during the baby boom than has been supposed. But surveys of the time suggest that most couples wanted at least three children. Married women of childbearing age queried in a series of national fertility surveys reported an average wanted or desired family size of 3.4 to 3.5 in 1955, 3.6 to 3.7 in 1960, and 3.3 in 1965.[19] Demographers have become skeptical of generalized questions on "desired family size." A better measure of attitudes toward numbers of children is whether or not each pregnancy was wanted at the time it occurred. Questions about each of the repondents' births in turn using this approach were used in Princeton University's National Fertility Studies of 1965 and 1970. According to Norman Ryder, co-director of the studies with Charles Westoff, "The answers reveal a great deal of unwanted fertility in the 1950s, despite the stated levels of desired family size."[20]

In his view, two children has been the "fixed" norm for American couples in the 20th century and "all people are expected to marry and have [these] two children as soon as their economic circumstances permit." Economic conditions were unfavorable for fulfilling this norm in the 1930s and favorable in the 1950s. Having had two children early, young mothers of the 1950s faced "a long exposure to the risk of unwanted fertility." They felt little economic pressure to enter an unfamiliar work world and thus were likely to be ambivalent about the desirability of "yet another child" and apt to "relax contraceptive vigilance."

The National Fertility Studies revealed that the downturn in married couples' fertility during the 1960s was due almost entirely to a reduction in unwanted or "unplanned" births. Between 1961-65 and 1966-70, the "marital total fertility rate" fell from 3.82 to 2.91 births per woman. The decline in unplanned births accounted for 84 percent of that change; the drop in planned fertility for only 4 percent.[21] This decline was clearly due

Women's lives centered on family and home.

largely to rapidly increasing use of the highly effective contraceptive methods introduced or popularized in the 1960s: the pill, IUD, and sterilization.

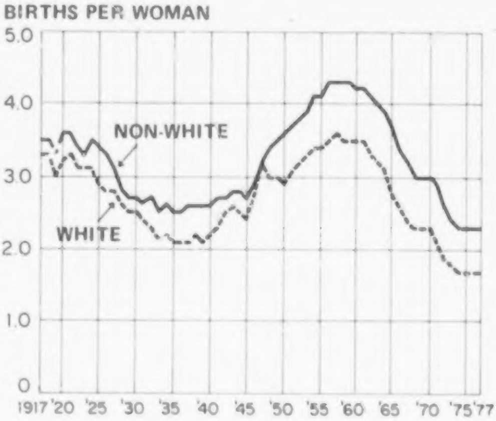
In 1965, as the baby boom waned, 67 percent of married U.S. couples were regular contraceptors. Of these, a third were using the pill or IUD or had been sterilized. Ten years later the figures were: nearly 80 percent using contraception and close to three-quarters of these using the three most effective methods.[22] Women seeking to prevent unwanted births in the baby bust era have also had the option of legal abortion that was unavailable to their counterparts in the 1950s. Legalized in some states beginning in 1967 and nationally in 1973, legal abortions have climbed from 744,600 in 1973 to an estimated 1.4 million in 1978.[23]

Who Produced the Baby Boom?

Just about every sub-group in American society contributed to the baby boom—rich and poor; white and black; Christian and Jew. But some, such as blacks and Catholics, were more involved than others.

Fertility trends among American blacks have virtually paralleled those of whites but always at a higher level.[24] As with whites, fertility among blacks had fallen to historic lows in the 1930s. In 1936, the total fertility rate for nonwhites (90 percent of whom were black) was only 2.5 births per woman. (The rate for white women reached its prewar low point in the same year at 2.1.) By 1956-58 it had peaked at 4.3 and remained close to that level until 1962 before beginning a steady fall in tandem with white fertility until the present day. In 1977 it stood at 2.3 births per women.

Figure 3. Total Fertility Rates for U.S. Non-White and White Women: 1917-1977



Sources: See Figure 1.

As can be seen in Figure 3, the effect of the baby boom was greater in the black than in the white portion of the U.S. population. Among whites, fertility actually stabilized for a few years after the initial postwar spurt in 1946 and 1947. Among blacks, however, "with the onset of the baby boom in 1946 fertility . . . rose year by year and attained a level in 1957 that it had never before exhibited in the recorded statistical history of the United States."[25] As a result, the baby boom generation represents a higher proportion of the black population than it does of the white population. In 1979, for example, Census Bureau figures show that people aged 15-24 (born in 1955-64) comprised 19 percent of the black population compared to 17 percent among whites.[26] Since young black males are more likely to be undercounted than any other group, the actual difference is probably somewhat greater.

The National Fertility Studies suggest that a much higher rate of unwanted fertility explains much of the difference in black and white fertility but the difference narrowed rapidly in the 1960s as the baby boom abated. In the first half of that decade, black married couples had three times as many unwanted births as their white counterparts and a 40 percent higher rate of fertility. By the end of the decade, the excess of black over white fertility had shrunk to 10 percent, levels of unwanted fertility were almost on a par at low levels, and a greater proportion of black wives than whites were using the pill or the IUD.[27]

Catholics are another group who were apparently affected more than average by the baby boom. Vital statistics are not available by religion, but numerous surveys taken over the years allow some general conclusions on their fertility relative to that of non-Catholics.

Fertility has traditionally been higher for Catholics than non-Catholics but all the evidence suggests that a gradual convergence took place during the 1920s and 1930s; that is, fertility fell for Catholics and non-Catholics alike, but the rate of decline was greater for Catholics. Some demographers of the day were predicting eventual equalization. A.J. Jaffe, for example, wrote: "The fertility of the Roman Catholics . . . appears to be decreasing so rapidly that by 1930 their fertility appears to have closely approached that of the non-Catholic."[28]

After World War II, however, when fertility mounted among all groups, Catholics exhibited greater gains than non-Catholics. Dudley Kirk concluded in 1955 that "the Catholic birth rate since the Second World War has reached a high and sustained level, with quite as large a differential [compared to non-Catholics] in crude rates as was recorded in the early 1920s."[29] Thomas Burch arrived at a similar conclusion in 1966: "In the U.S., recent evidence points to a persistent and even widening of the Catholic-nonCatholic differential."[30]

Unlike the black-white differential during the baby boom, the main reason for the Catholic/non-Catholic divergence appears to be that Catholics wanted more children. Catholic women who bore their children during the crest of the baby boom reported an average of 3.32 wanted births in the 1970 National Fertility Study compared to 2.55 for non-Catholics. But among younger women the differential was a narrow 2.75 to 2.35 wanted births.[31] Other evidence points to a new convergence taking place as fertility continued to decline in the late 1960s and 1970s.[32] And by 1975, almost as large a proportion of Catholic as non-Catholic married couples were practicing contraception (76 versus 80 percent) and the proportions using the pill were the same in both groups (34 percent).[33]

Thus it appears that Catholics and blacks contributed proportionately somewhat more than other Americans to the baby boom. But more important than these slight aberrations is the fact that all groups did in fact participate in the boom and in the fertility troughs that preceded and followed it. It was indeed a "giant generation" and one that will continue to pose tremendous challenges for U.S. society as it moves through its life cycle. Later sections discuss some of these challenges, but first we take a look at how the baby boom cohort and its neighbors—the Depression and baby bust cohorts—are likely to fit demographically into the nation's future.

Measuring Future Cohort Dimensions

Measuring the pre-1980 demographic impact of the baby boom is simple. One merely traces the U.S. population by age and sex through each year of the 1960s and 1970s. Determining the post-1980 *numerical* impact of the baby boom is also quite straightforward. Its members and those of the 1930s Depression cohort and 1970s baby bust cohort are already born. Following their numbers through the various stages of the life cycle is a basic demographic exercise, given the relative stability of age-specific death rates, especially among younger segments of the population.

Future immigration must also be considered, but even that number, when broken down by age and sex, is unlikely to be large enough to distort projections of the *size* of the various cohorts as they go through life.

Defining the *proportion* of the population that the baby boom cohort will comprise after 1980 is more difficult since assumptions must be made about the numbers of children that will be born in the future in order to estimate the size of the total population at any given moment. And, as is well known, fertility is the most volatile of all demographic variables. Any variation in future fertility will not affect the *number* of people in the three generations that interest us. But such variations will change the *percentage* of the total population represented by these generations.

Assumptions for population projections

Population projections necessarily stem from stated assumptions about future demographic behavior. It is worthwhile considering that, although population forecasts or predictions can be wrong, population *projections* are by definition correct (given error-free computation). They merely project figures based on certain assumptions. However, these assumptions can be—and usually turn out to be—incorrect since the future is full of surprises. The closer the assumptions anticipate what will really happen, the more accurate the projections.

The assumptions underlying this *Bulletin's* projections of U.S. total population and thus the proportions made up of our three key cohorts are as follows. It is to be hoped that they prove to be close to eventual reality.

Fertility is assumed to increase slightly from the estimated 1979 total fertility rate of 1.85 births per woman to 2.0 by 1985 and remain at that level thereafter. Some discussions of the baby boom's impact rely on the Census Bureau's Series III projection which assumes a lower fertility rate of 1.7.* The results are more dramatic. However, in 1979, the total fertility rate rose slightly above the level it had been since 1974 and there is some evidence that it may inch up for several years.

Mortality reductions have been greater than expected during recent years. Indeed, the progress noted since 1973 in life expectancy has been dramatic and unanticipated. Mortality assumptions used in the 1977 Census Bureau population projections are already somewhat out of date. In this *Bulletin*, therefore, the progress projected to occur over 100 years in the Census Bureau projections has been compressed into 70 years. That is, average life expectancy at birth is projected to reach 72.8 years for males and 82.9 years for females in 2050—up from the current figures of 69.1 for males and 77.0 for females.

Net immigration is assumed to remain at 400,000 annually in current Census Bureau projections. In 1978, however, over 600,000 people entered the U.S. legally (many of them Indochinese refugees) and an unknown number departed. Still another unknown number entered illegally and some of these have left. Accurate figures on the annual flow of illegal migration in and out of the U.S. are simply unavailable although a recent working paper prepared by Census Bureau staff for the Select Commission on Immigration and Refugee Policy suggests that the number of illegal aliens *residing* in the U.S. in 1978 ranged between 3.5 and 5 million, considerably lower than some previous estimates.[34] It seems reasonable to assume that future net immigration will be greater than 400,000 per year, especially if illegal movements are considered. Thus for this *Bulletin*, it is assumed that net immigration (the difference between people entering and leaving the country) will average 750,000 annually and that the age-sex distribution of the group will reflect that noted in recent years for legal immigrants, that is, relatively youthful and with more males than females.

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*Current Census Bureau population projections assume a gradual transition from today's fertility levels to one of three different levels. Series I, the highest, assumes that women over the long run will average 2.7 children apiece. Series II assumes a long-run "replacement-level" total fertility rate of 2.1, that is, the level of fertility that would eventually balance births and deaths if mortality remains at current levels. Series III, the low projection, assumes a long-run total fertility rate of 1.7, slightly below the rate experienced in the U.S. since 1974.

In brief, in projecting the future size and proportions of the Depression, baby boom, and baby bust cohorts, we assume a total fertility rate of 2.0 births per woman (as from 1985), average life expectancy rising to 72.8 for males and 82.9 for females by 2050, and net immigration of 750,000 per year.

Future fertility behavior will not affect the size of these cohorts, though it will affect their proportions of the population. However, both mortality and migration behavior will affect the size as well as the proportions of the three cohorts.

Demographic Impact of the Baby Boom

Population age-sex distribution

The demographic importance of the baby boom is best seen through a series of population age-sex pyramids. Figure 4 (centerfold, pages 18-19) traces the changing shape of these for the U.S. from 1960 to 2050 as our three cohorts move through life from age 0-4 (bottom of the pyramid) to age 80 and up (top of the pyramid). In 1960, members of the Depression cohort (born 1930-39) are 20 to 29 years old. Their fewer numbers cause a narrow spot in the pyramids into the 21st century. In 2010, this cohort will be aged 70 to 79. The baby boom cohort of the 1950s stands out in all the pyramids, even in old age! In 1960 that cohort forms the base of the pyramid. The large numbers it represents are noted among those 10-19 in 1970; 40-49 in 2000, and, of course, 70-79 in 2030. In marked contrast is the baby bust cohort of the 1970s. Their 10 million fewer births than those which produced the baby boom cohort are reflected in the pinched-in base of the 1980 pyramid and throughout life this cohort is overshadowed by its giant older relative—the baby boom cohort.

Cohort impact on fertility, mortality, migration

Thus far, we have concentrated on how changes in fertility have contributed to these three startingly different cohorts. Interestingly, the sharp variations in the size of these cohorts in turn affects the demographic variables themselves.

The number of births has risen in recent years (as the crude birth rate is beginning to do) and this pattern will undoubtedly be maintained throughout the 1980s. This is the so-called "echo" effect of the baby boom. By 1985 there will be 20.5 million women in the prime childbearing ages of 20-29—2½ million more than in 1975 and 8 million more than in 1965. Thus annual *numbers* of births will rise during the 1980s even if the fertility *rate* remains at a low 1.7 to 2.0 births per woman.

As the baby boom generation ages, it helps push up the median age of the population—especially if fertility remains low. This artificially raises the crude death rate, the annual number of deaths per 1,000 population. Older people are more likely to die and with more of them in the population there are bound to be more deaths. When the baby boom cohort becomes elderly, crude death rates will go up even more as some 19 percent of the population will then be 65 or over compared to 11 percent in 1980.

Young adults, usually between 20 and 30, are more likely to move than older people. Again, the baby boom and baby bust cohorts affect the overall rate of mobility. During the 1980s, the baby boom generation will be in the peak 20-30 moving ages. Migration to the Sun Belt states, for example, will probably remain high as the baby boom generation passes through the stage of life when they are most likely to change residence.

In reverse, as the smaller baby bust cohort goes through life, annual numbers of births should drop off sharply, the U.S. population may become generally less mobile, and even the crude death rate will fall when this smaller cohort reaches the oldest ages and the outsize baby boom cohort has ceased to exist. Thus, while fertility is the prime contributor to the making of these generations, these cohorts in turn, by virtue of the extreme divergence in their sizes, contribute to wide variations in fertility, internal migration, and mortality.

Impact on non-demographic variables

One glance at the population pyramids in Figure 4 reveals clearly that a country's age composition is strongly affected by variations in cohort size. In turn, many socioeconomic variables are directly affected by this age distribution. For example, crime and unemployment rates are highest among teenagers and young adults under 25 and the passing of the baby boom bulge through these stages is blamed for the upturn in those statistics in the late 1960s and 1970s.[35]

Now at the start of the 1980s, the baby boom cohort has reached the ages of 20 to 29. There are 40 million of them, comprising 18 per cent of the population—up from 22 million people and 12 percent of the population in that age bracket in 1960. Some economists see this as the explanation for the low overall U.S. savings rate of 4.5 percent and high 19.1 ratio of consumer debt to disposable income in 1979. People in their 20s and early 30s tend to earn and save less and borrow more than any other group in order to buy homes and expensive durables such as appliances, furniture and automobiles. It could also explain the much publicized recent decline in U.S. labor productivity—worker output per hour worked. With the large supply of relatively cheap young workers, employers have been able to maintain production without investing in labor-saving equipment.[36] There is no doubt that escalating inflation (up to an annual rate of over 18 percent in March 1980) is due to high current consumer demand and lower productivity, so the maturing of the extra-large baby boom cohort into the 20-29 year-old age range may be a prime factor here.

Changes in age composition affect all aspects of the business world. Demands for baby products fell off so much in the 1970s with the advent of the baby bust generation that Johnson and Johnson began pitching their advertisements to young adults, going so far as to employ professional football players as their "salesmen." Gerber Baby Foods has set up a life insurance division that boasts, "Gerbers now babies the over-50s." Insurance sales are greatly affected by age composition. A recent *American Demographics* article notes:

> "Almost one-third of all life insurance purchases are made by people in the 25-34 age group, and insureds in this age group spend more dollars on life insurance than others. Over 60 percent of those in their 30s pay more than $260 annually for life insurance, while payments below $120 per year are concentrated among the over-60 age group. In the 1980s, the bulk of the population will be in their 30s. As a result, the life insurance industry can expect sales to grow and the size of policies purchased to become larger."[37]

The U.S. divorce rate—currently among the world's highest at 5.3 per

1,000 population (in 1979)—is likely to remain high as the baby boom generation passes through their 30s and early 40s, the ages when divorce is most frequent. And when this large cohort reaches the oldest ages, the stage at which medical needs are greatest, the nation's total medical bill is likely to surge far over its current level ($192.4 billion in 1978), even accounting for inflation.

Impact on Cohort Members

While their varying numbers distort the population's age composition and thus contribute to many social problems, attention should also be given to the *individuals* who comprise the Depression, baby boom, and baby bust cohorts. How are the members of these three generations of Americans affected by being part of such small or large cohorts?

The "good times" cohort

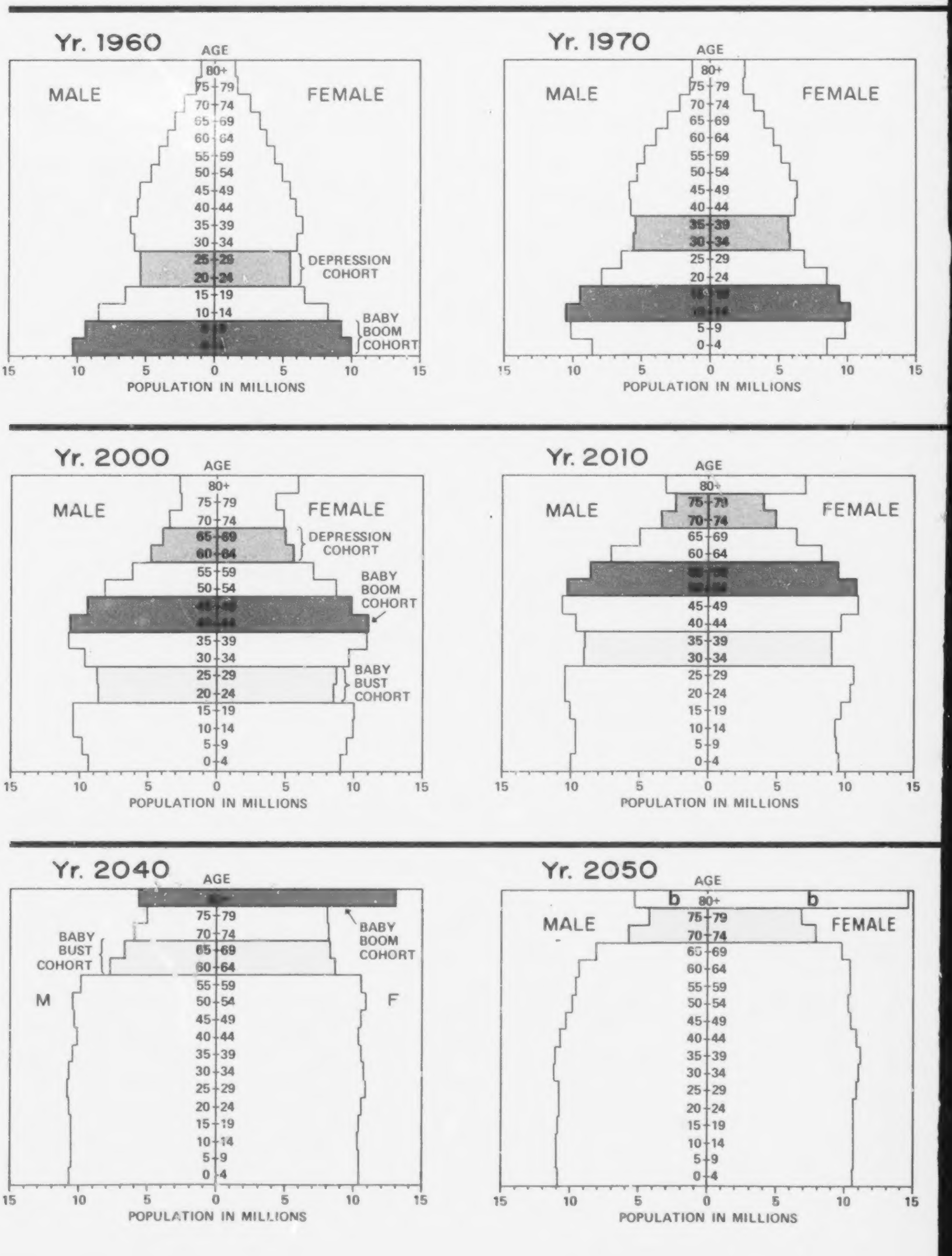
People born in the 1930s have been labeled the "good times" cohort. Although the Depression hung over their early years, this cohort has reaped the social and economic benefits of being smaller than the cohort that preceded it as well as the cohort that came after. Until the 1970s, it was the only such case in U.S. demographic history. During the 1930s, there were about four-and-a-quarter million fewer births than in the 1920s, and the good times cohort was followed by the baby boom cohort. Sociologist Carl Harter describes their advantages:

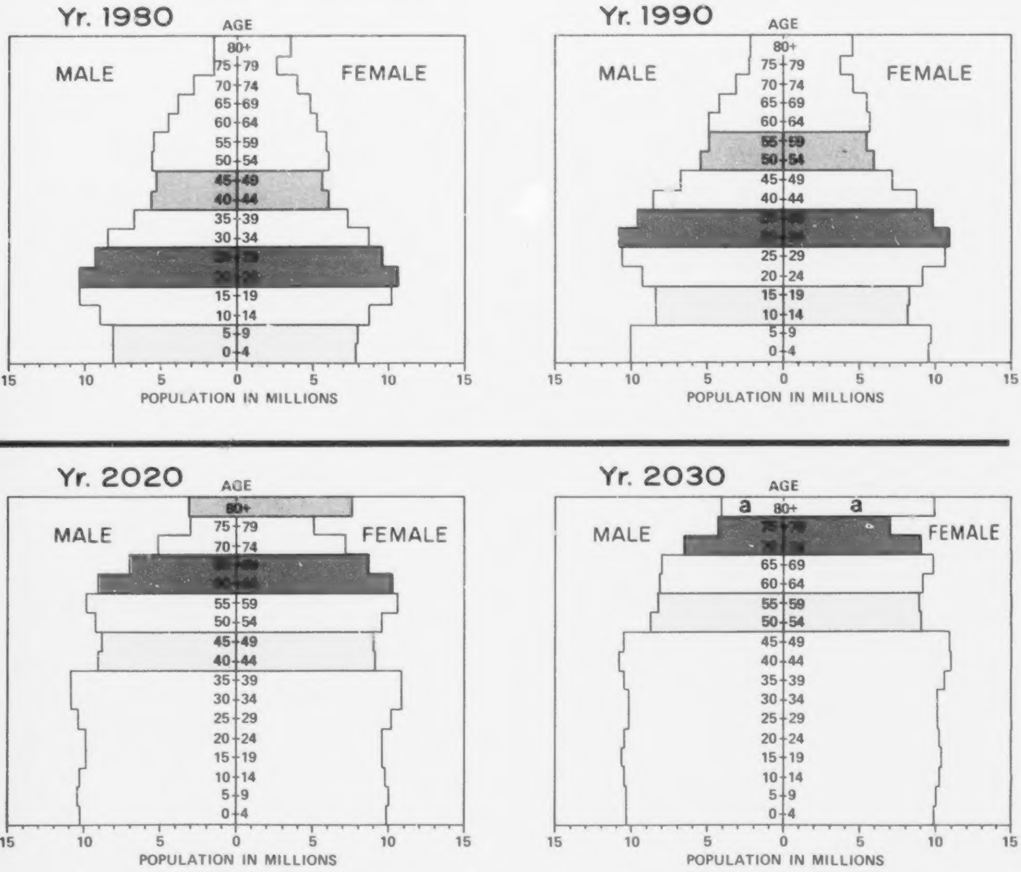
> "By virtue of their smaller number, the thirties cohort, upon encountering each important life cycle event, have experienced relative abundance—a legacy from the larger cohort that preceded them. . . . Relatively speaking, in all their important life cycle events, the 1930s cohort has 'had it made.' In 1950, when the thirties cohort was age 11-20, there were about a quarter million fewer 15-years-olds than there had been in 1940. Insofar as the number of high school classrooms, glee clubs, athletic teams, debate squads, class officers, etc., had not diminished, then the 1950 fifteen-year-old had a greater chance than did the 1940 fifteen-year-old of being in a smaller class, of being a class officer, of being a member of the glee club and athletic team and debate squad, etc. Similarly, in 1960, when the thirties cohort was 21-39 they required fewer new jobs and housing units than did their predecessors ten years earlier."[38]

The baby boom cohort

The baby boom cohort has not been as fortunate as its predecessor. Because of its much greater numbers, this group can expect problems and frustrations as it passes through the life cycle. Many are now in or just graduated from college. They have had to cope with overcrowded classrooms and teacher shortages through all their years of schooling. Many have entered the labor force, only to discover that there are not enough suitable jobs to go ground. Once employed, they will earn less relative to older workers than young workers normally do. In 1968, male college graduates aged 45 to 54 earned only 38 percent more than those 20 years younger. In 1978, the difference was up to 63 percent, largely because experienced older workers had become relatively scarce with so many younger people entering the work world.[39] Many members of the baby boom cohort are now seeking housing, which is scarce in relation to the demand and thus increasingly expensive. When they reach the peak of their employment years (30-44), there will be over one and a half times as many of them as there will be people aged 45-59. "Consequently, job advancement opportunities will be relatively fewer and competition for advancement far greater."[40] When they reach retirement age, the extra demands on the Social Security system could result in strains between the baby boom

Figure 4. Progress of Depression Cohort, Baby Boom Cohort, and Baby Bust Cohort Through U.S. Population Age-Sex Pyramid: 1960-2050





▨ DEPRESSION COHORT
PERSONS BORN 1930 – 39

■ BABY BOOM COHORT
PERSONS BORN 1950 – 59

☐ BABY BUST COHORT
PERSONS BORN 1970 – 79

Sources: 1960-1970: U.S. Bureau of the Census, *1970 U.S. Census of Population: General Population Characteristics. United States Summary*, Vol. I, PC(1)-B1, 1972, Table 52; and 1980-2050: Special unpublished tabulations prepared by Leon F. Bouvier for the Select Commission on Immigration and Refugee Policy, 1980

[a] Includes survivors of Depression cohort.
[b] Includes survivors of baby boom cohort.

Note: 1980-2050 projections assume a total fertility rate rising to 2.0 births per woman by 1985 and constant thereafter: life expectancy at birth rising to 72.8 years for males and 82.9 years for females by 2050; net immigration constant a 750,000 persons per year.

cohort and the younger persons who have to finance the system.

Clearly it will not be an easy path through the many phases of the life cycle for the baby boom cohort. "Social discontent will continue to be generated by the baby boom cohort. It seems as though wherever they are, it's raining."[41]

The baby bust cohort

The baby bust cohort of the 1970s should have a much easier passage through life. Like the Depression cohort, "Not only will there be fewer of them competing for jobs, services, and attention, but there also will have been an increase in public services and provisions made to accommodate the demands of the larger number of people that preceded them. They will be the beneficiaries of the baby boom."[42]

But this group could also be victims of the baby boom in their chances for career advancement. So many people only 10-15 years older will be employed that promotions may be a long time in coming. Demographer Conrad Taeuber suggests that middle-level positions may have to be created as "holding patterns" until the field is cleared of the older occupants of high-level jobs. Only when the baby boom cohort retires will senior positions finally be opened to those in their 50s.

All in all, however, insofar as demography shapes life chances, the baby bust cohort will enjoy an advantageous position, similar to that of the "good times" cohort. Indeed, it may be a little better off. The good times cohort was just a little smaller than its predecessor and much smaller than its successor. But the baby bust cohort is much smaller than its predecessor and will probably be a little smaller than its successor—the "echo effect" children of the baby boom.

It is clear that being a member of one of these cohorts can make a significant difference in the chances for success in life. This is not to suggest any form of demographic determinism. Yet being born a member of a large or a small cohort does alter one's odds for succeeding.

Baby Boom's Problems for Society*

Similar ups and downs will dog American society with the passing through of the vastly different Depression, baby boom, and baby bust generations. Manual Plotkin, former director of the Census Bureau, points out the problem:

> "The people born during the peak of the [baby] boom, the 1950s and early 1960s, will continue to be the largest population group throughout most of their lives. As this large group passes through each of these ages, the institutions that deal with population of particular ages will undergo the strain of rapid expansion and, a decade or two later, the often more painful task of precipitous retrenchment."[43]

It is perhaps safe to say that there are no societal problems, present or future, that do not have a demographic dimension. And for the U.S. today, the major demographic dimension is the existence of a very large cohort preceded and succeeded by small cohorts. Economist Robert Samuelson puts it this way: "You cannot understand economics or politics today without understanding the impact of the 'baby boom'."[44]

Many social scientists, planners and politicians have awakened to this simple reality only recently. The "discovery of demographics" showed up in President Carter's 1980 economic budget. "Demographic changes have substantial effects on the budget, some of which can

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*Some of the material in this section is derived from Robert H. Weller, and Leon F. Bouvier, *Population: Demography and Policy* (New York: St. Martin's Press, forthcoming 1981).

be anticipated. For example, we can estimate fairly accurately the number of people reaching retirement age a few years hence."[45]

At the heart of this new concern are two basic demographic concepts: the age structure of a population as a whole and the accompanying notion of cohorts, born in various decades. As the cohorts born in the 1930s, the 1950s, and the 1970s pass through life, they are disturbing the age structure of the U.S. population in the sense that the "normal" pyramidical pattern of a stable population is being disrupted by a cohort that is "too large" and two that are "too small." This is well illustrated in Figure 4. Disturbances in the age structure in turn can and do have tremendous impact on the society. Every institution will be affected. Each must plan in order to avoid the potential difficulties as these generations reach the ages with which it deals. The cohorts are born; they will go through all the stages of the life cycle. Fortunately, we know the numbers involved and, if we wish, can plan accordingly. As we will see below, that has not always been the case.

Education

Education as a social institution has perhaps been more affected by fertility variations than most other American institutions. The structure shifts resulting from the fertility fluctuations of the past 40 years have inevitably created substantial variations in school enrollment as well as in the number of available teachers. All three cohorts are involved in this problem.

In the late 1950s and 1960s, school enrollments soared as the baby boom cohort entered primary school and, later, secondary school. There they were taught, at least in part, by the relatively scarce members of the Depression generation. The elementary school age population (5-13) grew from 23 million in 1950 to 37 million in 1970. Shortages of teachers and classrooms plagued elementary schools as early as the mid-1950s, forcing them into double and even triple sessions. By the early 1960s, secondary schools were faced with similar problems. The high school population doubled in size between 1950 and 1975.

Soaring enrollments as the baby boom cohort reached college age helped fuel the student unrest of the late 1960s and early 1970s.

Colleges were next. Enrollments began skyrocketing in the mid-1960s, both from the sheer numbers of baby boomers and from the increased proportion of young people going to college. College students leaped from 3.2 million in 1960 to 9 million in 1975. Most certainly this dramatic demographic change helped fuel the student unrest of the late 1960s. The entire college environment changed in an incredibly short period, and that, coupled with the struggle over civil rights and pain of the Vietnam War, combined to give us the turbulent 1960s.

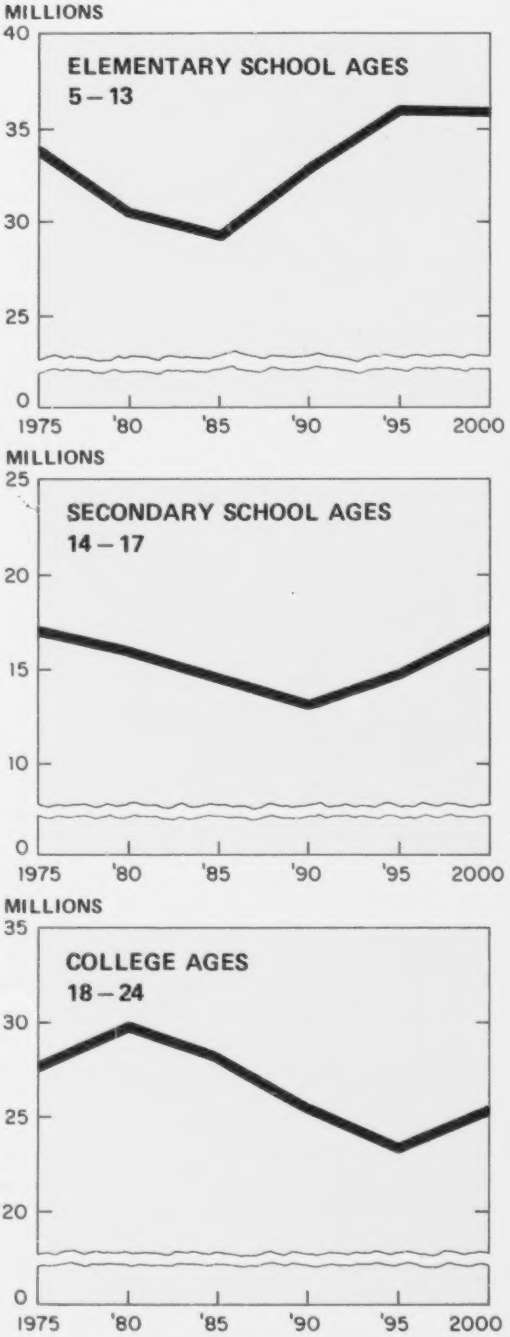
School planners were totally unprepared for the influx of youngsters entering school. In the early 1950s, few experts thought the baby boom would last into the late 1950s and early 1960s and administrators were not warned until it was too late. By the time new training schools had graduated enough teachers and massive building programs, voted unprotestingly by local taxpayers, had produced enough schools, the crest of the baby boom cohort was about to pass out of the school ages.[46]

Today, the situation has been turned around. There is a shortage of students and an excess of both teachers and school buildings. Again this can be explained demographically. Today's teachers are numerous not only because they come predominantly from the baby boom cohort but also because they were encouraged to become teachers by the shortages they themselves experienced while in school. On the other hand, the "shortage" of students in elementary schools--and, soon to be, in secondary schools—results from the low fertility of the 1970s. Now in 1980 there are fewer people aged 5-13 than there were in 1970 or even in 1965, and as Figure 5 shows, that number will fall even more by 1985 before growing slightly. The secondary school age population will follow a similar path a few years later:

> "The most notable fact is that each of the three school age groups is going to go through cycles in which the population declines for 10 to 15 years, and finally rises again. Thus the primary school ages can expect declines between now and 1985, marked gains between 1985 and 1995, further declines from 1995 to 2010, and finally gains after 2010. These same trends will have an impact on the secondary school population and college age populations about 5 and 10 years after they affect the primary ages."[47]

These temporary rises in enrollment that will occur later in the 1980s and on into the 1990s reflect the echo effect of the baby boom. Annual births have already turned up slightly (from 3.1 million in 1973—the bottom of the baby

Figure 5. Projected U.S. School Age Population: 1975-2000



Source: U.S. House of Representatives, Select Committee on Population, *Domestic Consequences of United States Population Change*, 95th Cong., 2nd sess., 1978, Figure 11, p. 45.

bust—to 3.5 million in 1979) and are expected to continue rising for some time, resulting in some increase in the number of children of school age five to ten years later. Ironically, the much-maligned teaching profession may offer good job possibilities in the not-too-distant future as a result of both the echo effect and the fact that not many college students are now entering that profession because of their perception of "not enough jobs."

The present combination of too many resources—faculties and facilities alike—and projections of enrollment increases in the relatively near future poses a dilemma for policymakers. It may be shortsighted to dispose of underutilized school buildings, knowing that enrollments will soon climb somewhat. Clearly, *flexibility* should be the guideline for policymaking, at least for the present. As to the long-run problem, some have suggested simply to have more babies. A larger school age population would, of course, create more jobs for teachers. However, it would also signal another population explosion—a dismaying alternative. A more productive alternative would be to improve the entire educational system by translating the decline in number of students into more resources per student.

Demographer Lincoln Day recently addressed this question:

> "Will this reduction in the number and proportions of school age children lead to an improvement in educational quality (however one cares to define this), or will it be seized upon, instead, as an opportunity to cut costs and allocate resources elsewhere?"[48]

To judge from reports of school closings across the country since the mid-1970s, school boards are overwhelmingly choosing the latter course of action.

Such decisions are unfortunate, not only for the children but also for American society itself. The cohort born in the 1970s—about 33 million—will probably prove to be the smallest cohort in the second half of the 20th century. It follows the massive baby boom cohort and will precede the echo cohort produced by the baby boom cohort as it reaches childbearing ages. Proportionately speaking, the number reaching the early stages of the professional-business part of the life cycle in about 2000 will be small. The nation cannot afford to waste any of this potential talent, rare as the source will be. It would be wise for society to ensure that this generation of the 1970s and early 1980s receives the best possible education to better train them for their adult responsibilities. As Alan Pifer suggests, in an article aptly entitled "Don't Forget the Children":

> "Every child alive today or born in the years just ahead, whether male, female, black, white, Hispanic or otherwise, will be a scarce resource and a precious asset as an adult in the early part of the next century. At that time, the nation's standard of living, its capacity to defend itself—perhaps its very viability as a nation—will be almost wholly dependent on the small contingent of men and women who are today's children."[49]

Household formation

Households, which now number approximately 80 million, grew by 15.5 million during the 1970s. This represents a 20 percent increase in just ten years. During the same period, the U.S. population grew by only 9 percent.

The baby boom generation are now young adults and are setting up their own households. This partly explains the vast increase in households. But there are other demographic factors involved. Families are getting smaller. Fertility has been falling; fewer young married couples live with their parents; and there are more one-parent families. Also, there are more single adults. Young people are postponing marriage, yet they leave their parental homes at an earlier age to set up housekeeping than past generations did. Divorce is becoming more common and each divorce usually adds yet another household. Annual divorces went over a million in 1975, and by 1979 were up to 1.2 million. Finally, people are living longer and more of the elderly are maintaining their own homes.[50] Thus, demographic factors, especially the baby boom, are having a significant impact on one of society's most important institutions—the home.

Many changes in the *nature* of household composition have occurred in recent years and will continue to occur in the future, attributable in large part to the factors listed above. Non-family households have increased at a more rapid rate than have family households—66 percent compared to 12 percent over the 1970 decade (see Figure 6). Most of this increase among non-family households is accounted for by young people who have never been married or who are separated or divorced.[51]

A very different profile of households emerges as we enter the 1980s. In 1970, 81 percent of all U.S. households were family types—70 percent maintained by married couples and 11 percent by single parents. In 1979, only 61 percent of all households included married couples and 13 percent were headed by single parents. Over a quarter of all households were classified as non-familial (Figure 6).

Households will continue to increase rapidly. The Census Bureau foresees over 96 million households by 1990—another one-decade gain of about one-fifth. By the turn of the century that number will undoubtedly surpass 110 million. In 1990, perhaps as few as 57 percent of all households will be husband-wife types. Another 14 percent will be headed by a single parent and the remaining 29 percent will be non-family households. These projections reflect the changes that have been taking place in recent years in age at marriage, divorce, family size and, of course, changes in age composition resulting from the baby boom and baby bust generations. Much of the future size and characteristics of households is dependent not only on the numbers but also on the behavior of the large baby boom cohort:

> "The behavior of this generation as it passes through its 20s and 30s [about 1975 to 1994], the traditional years for forming households, is not easy to predict. The decisions members of this group make about marriage, divorce and fertility should have a profound impact on what future households will be like."[52]

This mammoth increase in household formation is of course directly related to the consumer demand for housing. As economist William Serow points out:

> "Today, the rate of household formation—which most directly influences the growth rate of demand for housing—is much greater than the rate of population growth because of the large number of young adults in the population and the increasing incidence of divorce. While the former is essentially transitory, another consequence of the baby boom, the latter may well be permanent. Slower population growth is also likely to affect the composition of housing demand (smaller units with more convenience and luxury features), as well as to provide additional demand for second homes."[53]

Regardless of the *types* of housing desired by the new consumers of the 1980s one thing is certain: the large number of such new potential home buyers is a prime factor in the spiraling cost of housing which shares with soaring energy costs the leading role in fueling current inflation. The *Wall Street Journal* comments: "Now the big part of the [baby boom] bulge is between 20 and 30 years of age, the usual period of household formation, and it is beginning to dominate the housing market."[54] During the 1970s, 32 million Americans reached age 30—a milestone age for home purchasing. About 42 million will turn 30 during the 1980s. There will probably be little drop in housing demand until the 1990s when the baby bust cohort enters the market.

Quoting economist Dwight Jaffe, the *Wall Street Journal* continues:

> "For the [building] industry, the demographic factors are the most positive they've been in a long time. He (Jaffe) expects an average of slightly more than two million housing starts a year over the next 10 years, compared with an average of about 1.7 million over the past 10. 'The industry is ratcheted up a whole notch. The 1980s are going to be glorious.'"

These optimistic views are not subdued by the prospect of ever higher interest rates on borrowing and tighter credit regulations. It will not be enough to flatten the rise, contends Kenneth Rosen, Princeton economist, "even high interest rates aren't likely to kill this boom because it's demographically based."

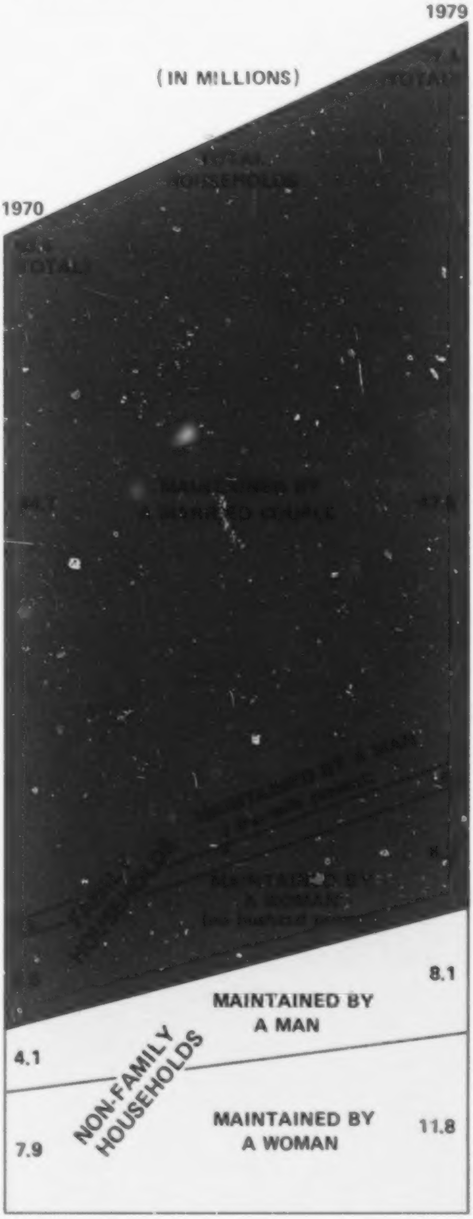
The giant generation as it enters the stage of life when household formation is most likely is thus having a tremendous impact on that particular aspect of society. The impact stems not only from its sheer size but also from its own demographic behavior—low fertility, later age at marriage, increased female labor force participation. Together these factors are contributing to major changes in the nation's family and household makeup as well as booming sales for the housing industry and its subsidiaries such as furniture and appliance manufacturers.

The labor force and employment

During the 1976 presidential campaign, candidate Jimmy Carter argued that the number of unemployed people had increased during the Nixon-Ford years. The then incumbent president, Gerald Ford, countered that more people were employed during those years than ever before in history. Many voters saw this exchange as just another example of campaign rhetoric, but both candidates were telling the truth.

Population increases result in more

Figure 6. Number of U.S. Households by Type: 1970 and 1979



Sources Note: Adapted with permission from Arthur J. Norton and Paul C. Glick, "What's Happening to Households?" *American Demographics*, Vol. 1, No. 3 (March 1979) p. 20, updated to 1979 from U.S. Bureau of the Census, "Households and Families by Type: March 1979 (Advance Report)," *Current Population Reports*, Series P-20, No. 345, October 1979.

people being available for employment. Most of them are actually working. However, by 1976 the baby boom had greatly expanded the proportion of teenagers and young adults in the population and it is in these groups that unemployment rates tend to be greatest. Thus the number of unemployed people increased at the same time that the number of employed persons also increased.

Since 1976, however, there has been a shift in this trend. In the election month of that year, November 1976, the U.S. labor force stood at 95.8 million people—88.3 million of them employed and 7.5 million unemployed. The overall unemployment rate was thus 7.8 percent. In March 1980, the total work force was up to a near record 104.1 million. Employed persons had increased by nearly 10 million to 97.7 million, while both the number of unemployed (6.4 million) and the unemployment rate (6.2 percent) were well below the 1976 level.[55]

In response to the baby boom's arrival at working age, the U.S. labor force added an average of over 2 million people a year from 1968 to 1978. Most of the new entrants were young people. By 1978, 58 percent of all teenagers were either working or looking for work—nearly 5 million more than in 1960. Inexperienced teenagers take longer to find work and switch jobs more often and thus force up the general unemployment rate. A recent Bureau of Labor Statistics report noted that the U.S. economy had created 12 million new jobs from 1974 to 1977, but unemployment was reduced by only 2 million because so many of the new jobs were taken by new entrants.[56]

The pressure of the baby boomers on the job market during the 1970s was compounded by an enormous influx of women. Labor force participation rates for women soared in part because of the baby bust fertility decline. The increase is startling: in 1960, 35 percent of all women aged 16 and over were working or actively seeking employment. Today in 1980, over half of all women are in that category. Nineteen million women joined the work force between 1960 and 1974, accounting for 60 percent of its growth.[57]

An outstanding feature of women's entry into the labor force has been the increased participation of married women, particularly those with preschool age children. In the past, these women were least likely to be employed, yet since 1965 the most rapid increases in rates of labor force participation have been among women with children under 6 years of age. Evidently factors which once kept women off the job market such as marriage and/or young children are now being outweighed by inflationary pressures on family budgets and women's desires for their own occupation and income.

With over half of women already working and the bulk of the baby boom cohort due to move beyond the job-entry stage, labor force growth will probably decline during the 1980s. Economist Alan Greenspan puts the likely rate of increase during the next decade at 1.7 million persons per year or 1.6 percent, somewhat slower than in the 1970s. Even that growth rate itself will fall through the decade from 2.3 in 1977 to 1.2 in 1990. He comments:

> "In any case, the tapering off of new entrants leads to the assurance of a more mature work force in the 1980s. By 1990, seasoned workers in the prime of their working lives, that is between the ages of 25 and 54, will constitute 70 percent of the labor force. Women will be contributing a lot, in different ways, to the accretion of experience. Right now, women have fewer years on their current job than men, especially in the older age groups. But that gap is already starting to narrow. An increase in early retirement is removing men with longer tenures, while women's working careers are getting longer than they used to be."[58]

The changing age structure of the near future should bring some good news, economically speaking. The number of elderly will increase (though their proportion of the population will grow only slightly for some time) while the number of infants and children will decline (assuming continued low fertility). Thus there will be more workers and fewer people dependent on them. A decrease in the number of dependents should cause per capita income to rise even in the absence of any increase in real earnings. But there is reason to anticipate that declining population growth will increase real wages in the next few years. Economist William Serow notes:

> "First, as the baby boom youth pass into middle age, their unemployment rate will decrease and their earning level will increase. Second, because smaller cohorts will replace them at the entry level, that means the need to devote a large share of capital to equip them will lessen. If the amount of capital available per worker increases, and with it the productivity per worker, real wages could rise without contributing to inflation."[59]

These labor force forecasts generally assume continued low fertility and continued participation of married women. Changes in these, as well as in the size and age composition of the immigration stream, could substantially affect both the size of the labor force and its age composition, especially after 1990. In any event, it is clear that the U.S. economy will have to generate still more millions of jobs to cope with newly available job seekers who will continue to flood into the labor market over the next two decades. Given high rates of inflation and low rates of investment, meeting this need will prove difficult.

Political institutions

In November 1980 when the presidential election takes place, people aged 18-29 will represent the cohort born between 1951 and 1962—the heart of the baby boom. These under-30 potential voters will comprise 30 percent of the potential voting population—the highest proportion ever for this age group and the highest it may ever be. Nevertheless, neither political party appears to be emphasizing a youth-oriented platform. Indeed, the emphasis seems to be aimed at attracting older voters.

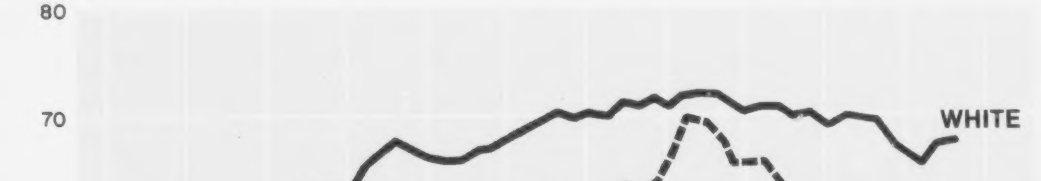
The reason is relatively simple. Young adults and teenagers are not as likely to vote as are their older counterparts. Figure 7 (page 28) shows the proportion of people of voting age (18 and over) who voted in the most recent presidential election of November 1976. Only 38 percent of the people aged 18-19 voted; about half of those 25-29 voted; but 70 percent of those 55-64 did so. The situation was even more dismal in the 1978 Congressional election. Only 18 percent of the 18-19 age group voted and about a third of those 25-29. But 61 percent of the 55-64 group voted. There is a direct correlation between age and the propensity to vote—at least up to age 65.

If such a correlation is maintained, it will be another 20 years before the baby boom generation has any real impact on the election process in the United States. However, should this potentially powerful voting block be motivated because of some specific issue perceived as being directly related to its interests, it could possibly become the prime force in the election—and of course in the defeat—of any particular presidential candidate.

The impact of birth cohorts on political institutions cannot be discussed without some mention of the military—that part of the political institution apparently responsible for the maintenance of a peaceful co-existence with other nations.

The most likely group to be called up for military service is that between the ages of 18 and 24. Census Bureau estimates for July 1, 1979, indicate a population aged 18-24 of 29,285,000. These people were born between 1954 and 1961—peak baby boom years. The number of people aged 18-24 will drop substantially over the next two decades.

Figure 7. Percentage of Persons of Voting Age Reporting Voting in November 1976 Election



Source: U.S. Bureau of the Census, "Voting and Registration in the Election of November 1976," *Current Population Reports*, Series P-20, No. 322, March 1978, cover chart.

By 1990, the 18-24 population will have fallen to 25,149,000—14 percent below that of 1979. By 2000, the Census Bureau projects a slight further fall to about 24,600,000. The only way that number could be raised would be through increased immigration of persons young enough to be in the 18-24 age bracket in 1990 or 2000. One would have to also assume that many of these immigrants would be willing to serve in the U.S. armed forces.

Of course, not everyone aged 18-24 serves in the military even in wartime. While the number of women recruits has gone up in recent years, women still comprised only a small 7 percent of the armed forces at the end of 1979 (154,800 of a total of 2.3 million).[60] The most obvious source for expanding the size of the armed services would seem to lie there—encouraging female recruitment to compenstate for the declining overall number of people aged 18-24, the result of the changes in U.S. fertility between the 1960s and the 1970s. This alternative appears unlikely in the near future, however, considering the negative public reaction in early 1980 which forced President Carter to drop the proposal that young women as well as men should register for a potential draft.

The probability of voting among young adults may be related to the probability of being drafted into the military service. Currently the pool of potential draftees is large. But it will soon begin to shrink. The pool of potential young voters is now also large. Is a military draft the kind of issue that could unite this potential voting block?

The elderly and Social Security

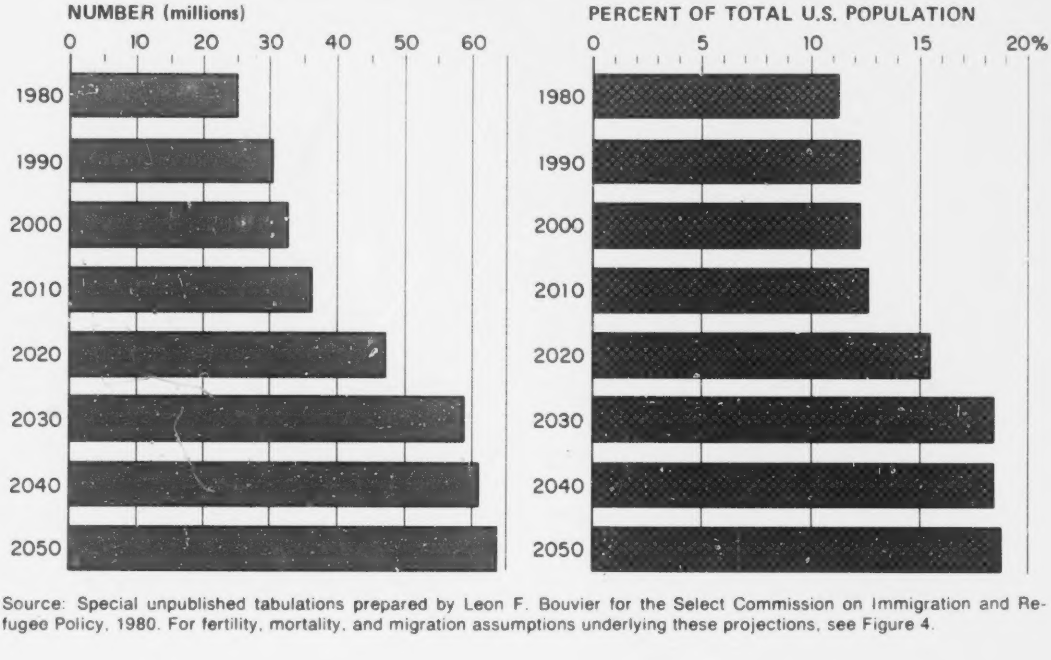
Much has been written about the coming "senior boom." Unfortunately, much of the speculation is incorrect. Indeed, misinformation has been so rampant that the Census Bureau found it necessary to comment on this issue in a recent report on the elderly:

> "Obviously statements sometimes made in the press and elsewhere that over one-third of the population of the United States will be over 65 years in another quarter to half a century are unfounded. This would be 'possible' only if fertility continued at replacement or sub-replacement level and death rates were reduced to zero or near zero in the next few years."[61]

Currently, there are about 25 million people aged 65 and over in the U.S. That number will ease up to about 31 million at the turn of the century. Only after 2010 will the number escalate and reach perhaps 59 million by 2030 (see Figure 8). This growth pattern of the elderly population reflects the size of the Depression cohort as well as that of its successor of the baby boom. Indeed, the decennial percent increase in the population 65 and over will be very small in the 1990s, a consequence of the low fertility of the 1930s. It will soar between 2010 and 2020 and between 2020 and 2030 as the baby boom generation enters the last stage of its life cycle.

Up to 65 years in the future, we can be quite certain of the number of elderly persons in the total U.S. population. More difficult is to project what proportion they will comprise of that total as this depends on future fertility behavior. Higher fertility means a lower proportion of elderly; lower fertility means a higher

Figure 8. Projected Number and Proportion of Persons Aged 65 and Over in the U.S. Population: 1980-2050



Source: Special unpublished tabulations prepared by Leon F. Bouvier for the Select Commission on Immigration and Refugee Policy, 1980. For fertility, mortality, and migration assumptions underlying these projections, see Figure 4.

proportion of 65-year-olds and older. According to the assumptions of this *Bulletin*, the elderly will make up about 19 percent of the total U.S. population of 2030—almost double the 11 percent of 1980 (Figure 8). In other words, 50 years from now nearly one of every five Americans will be aged 65 or more compared to just over one in ten today.

As the baby boom cohort moves through its retirement years it will create one last major disturbance for society. The generation which caused an upheaval already in the late 1950s upon entering the school system will not simply disappear quietly. Its most significant disturbance for society will probably come in its final stage of life. Furthermore, because of both its sheer size and its gains from increased life expectancy, growth within the elderly baby boom cohort will be overwhelmingly among those aged 75 and over. Thus the elderly group itself will grow older and in so doing will prolong the cohort's existence.

Increased proportions of the elderly will require changes in consumption patterns as well as a vast reordering of public priorities. Goods and services which are used more with advancing age will be in increased demand: nursing homes, hospitals, pharmaceutical products, group housing arrangements, homes for the aged, etc. Judging solely by demographic considerations, not only will total spending on the elderly rise but also the *average* spent per person aged 65 and over will go up because there will be more of them in the very oldest, most dependent ages.

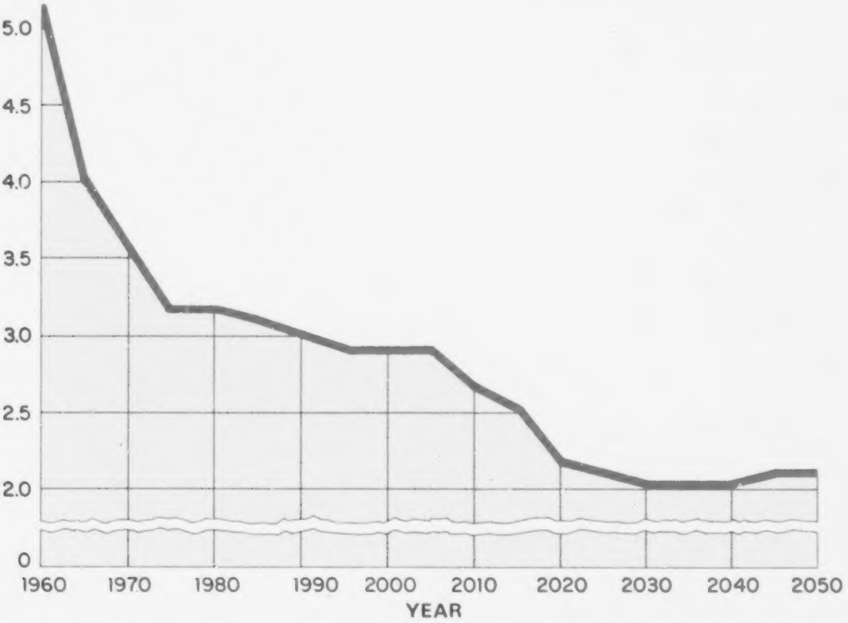
The changes in public priorities are less visible but perhaps more dramatic. Increasingly, we speak of the "graying" of the U.S. budget because of the increased proportion of funds earmarked to serve the elderly. In 1969, the elderly received 17 percent of the federal budget. In fiscal year 1981, one quarter of the total federal budget will go for support of older people and their dependendents—an amount larger than requested for any other single category of federal expenditure including defense. This share might reach 40 percent in 2025 when the baby boom elderly population is at its peak, according to former HEW Secretary Joseph Califano.[62]

Looming large among the potential problems associated with future growth of the aged population is the Social Security system. Currently the system is experiencing financial problems. One reason, though not the only one, is the increasing number of 65 year-olds and older. These problems will intensify after 2010 when that age group is taken over by the baby boom cohort. The middle-aged persons who will then be working and paying into the Social Security pool will be those of the smaller baby bust cohort. Thus relatively fewer economically active people will be paying for the "welfare" of an increased number of elderly. An inter-generational quarrel is not impossible, given the situation.

Looking only at the elderly population overstates the problems and greatly oversimplifies the issue of dependency. As Figure 9 shows, the massive growth in the elderly population in the early part of the next century does translate into a falling number of persons paying Social Security payroll taxes in relation to each elderly beneficiary. But if fertility remains low, the proportion of dependent children in the total population will go down which will compensate for the increase in the elderly population. Rather than concentrate solely on the future proportions aged 65 and older, economic planners should be looking at the total "dependency ratio." Doing so yields a more complete picture.

In 1980 there were 64.7 people of dependent age (under 18 or 65 and over) for every 100 persons in the working ages (18-64). If fertility stays at 1.8 births per woman and net immigration at 750,000 per year, by 2000 the dependency ratio will have *dropped* to 58.6. Even in 2020 when the baby boom

Figure 9. Projected Number of Persons Paying Social Security Payroll Taxes per Beneficiary Aged 65 and Over: U.S., 1960-2050



Source: U.S. House of Representatives, Select Committee on Population, *Domestic Consequences of United States Population Change*, 95th Cong., 2nd sess., 1978, Figure 13, p. 73.

cohort begins to retire, the total dependency ratio would only be 61.2—still below the 1980 level. Indeed, if fertility increases to 2.0, in line with our earlier assumption, the dependency ratio of 2020 would also be below that of 1980—64.3 versus 64.7.

Although the growing elderly population will pose difficulties for society, a major problem may well be that of developing the will and commitment necessary to switch the emphasis from expenditures for the young to expenditures for the aged. Making such a shift is far from simple. Political difficulties can be foreseen when it is suggested that the two age groups are interchangeable. Currently public expenditures to support an elderly person are three times what they are per youth. Also much public spending on young people is for education which is financed largely by state and local taxes, whereas most public spending for the elderly comes from federal funds. An increasing proportion of older persons could thus raise the issue of federal versus state and local responsibilities and spending.[63]

Obviously major alterations in our overall economic, social, and political systems will have to occur if we are to provide adequate care and shelter for the senior citizens of 40 years hence. Fortunately there is time to plan for these changes. Because the baby boom cohort is now entering the labor force and will continue to swell the ranks of the employed for the next 20 years, there will be no marked increase in the ratio of elderly persons to working-age population until after 2010. Only then when the baby boom generation becomes the senior boom will its place in the work force be taken by the baby bust cohort. The ratio of people 65 and over to the active population will rise rapidly to a peak in 2030. The changes will be drastic and it is not too early to begin adequate preparations for their coming.

The Future: Dismal or Happy?

It might seem reasonable to conclude that all will not go well with U.S. society until the giant baby boom generation passes out of existence around the middle of the 21st century. There can be no denying the many disturbances that emanate from this interruption of the long historical decline in fertility—a trend resumed with the somewhat misnamed baby bust of the 1970s. Clearly the sudden "dumping" of an extraordinarily large number of people of a specific age on the society necessarily results in certain upheavals in that society's institutions.

All the news is not bleak, however. The baby boom generation is on the verge of entering the most productive phase of life. It has all but completed the earliest troublesome phases and U.S. society has survived! That the baby bust generation follows is also reason to be optimistic about the future.

As the number of people diminish in those troublesome early life stages—school age, early adulthood, family formation—the problems attendant to those ages will also decrease.

Further, as the baby boom cohort sheds its "dependent" label and becomes "economically active," it should cease being a burden on society. Whereas having "too many children of school age" was a problem for society, having "too many active adults" will be a boon for the society. The dependency ratio will fall as more people are added to the active population (18-64) while the number of young dependents will decline because of the baby bust and the number of elderly dependents will grow only slightly—the increase held back because of the good times cohort (born in the 1930s):

> "This demographic change should not fuel inflation and it should have little effect at all on total consumer demand, although it will change the composition of that demand. . . . Income per person will rise in the next few decades as the relative size of the working-age population rises simply because the number of young dependents will be comparatively small. Unemployment rates should diminish as the labor force grows older, leaving entry-level positions to the smaller generation following."[64]

Finally, because of its sheer size, the baby boom cohort has forced society to restructure a number of its institutions. Educational facilities and faculties—from kindergarten to graduate school—are in place and generally sufficient to handle future enrollments, thanks to pressure from the baby boom generation. Housing stocks have soared in recent years and, barring economic difficulties, will continue to soar during the 1980s because of pressure from the baby boom generation. The near future will see the creation of more slots in the economy, filled first by members of the baby boom generation and then made available for the next generation. But there is a complication here:

> "The maturing of the [baby boom] generation is going to take place at the same time as the energy crunch raises costs and slows down the economy. If this combination is not thought about fairly carefully before fully into it, it could prove disastrous. However we respond, the population bulge increases the likelihood that we will switch from being a consumer society to being more a conserver society."[65]

The baby boom generation's final impact may also be positive, although it could at first be extremely troublesome. The huge numbers of elderly after 2020 will pose a final enormous baby boom problem for U.S. society. Yet the long-run contribution may well be positive. With the political clout they could wield, the baby boom elderly could assure social changes that would protect and benefit the oldest citizens of following generations.

Whatever does occur to our society, we can be certain that the behavior of the baby boom generation will be a major contributor. Future planning must constantly take into account the fact that back in the late 1940s young Americans decided to marry early, have their children soon after marriage, and produced somewhat larger families than their parents did and that pattern was not abandoned until the mid-1960s. The giant baby boom generation resulted and will be with us for another 70 years. ☐

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Sweden Faces Zero Population Growth

Abstract—Despite a wide range of family supports, Sweden's birth rate was down virtually to its death rate in 1979 and its population is projected to decline from 1986 on. This *Bulletin* examines the causes of the fertility decline and the concerns and ambivalence of Swedes about zero population growth, reminiscent of the 1930s when birth rates also fell to record lows, and which they now share with others of their European neighbors. The fertility decline is related to a drop in marriage rates and sharp increase in non-marital cohabitation, increasing education and escalating employment rates among women, the cost of children in the face of high tax burdens and living costs, and increased availability of effective contraception and legal abortion. If fertility remains below replacement at 1.8 births per woman and immigration balances emigration as now projected, the proportion of persons 65 and older will rise from 16 percent in 1977 to 20 percent of the population in 2025, higher than has been conjectured for a ZPG society. Financing retirement and medical benefits for the elderly already demands nearly half of the large total spent on social welfare and is escalating. Since World War II Sweden has welcomed refugees and until the 1970s encouraged immigration to fill labor needs. Integrating the newcomers into the historically homogeneous society has caused problems despite conscientious policy efforts. Reducing immigration could mitigate these problems but could also mean an earlier and faster population decline than now projected. By 1979, the low population growth rate of 0.2 percent was entirely accounted for by net immigration plus natural increase among immigrants. Among Swedish citizens, who still make up all but some 425,000 of the 8.3 million population, there were fewer annual births than deaths from 1976 to 1978.

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By Murray Gendell

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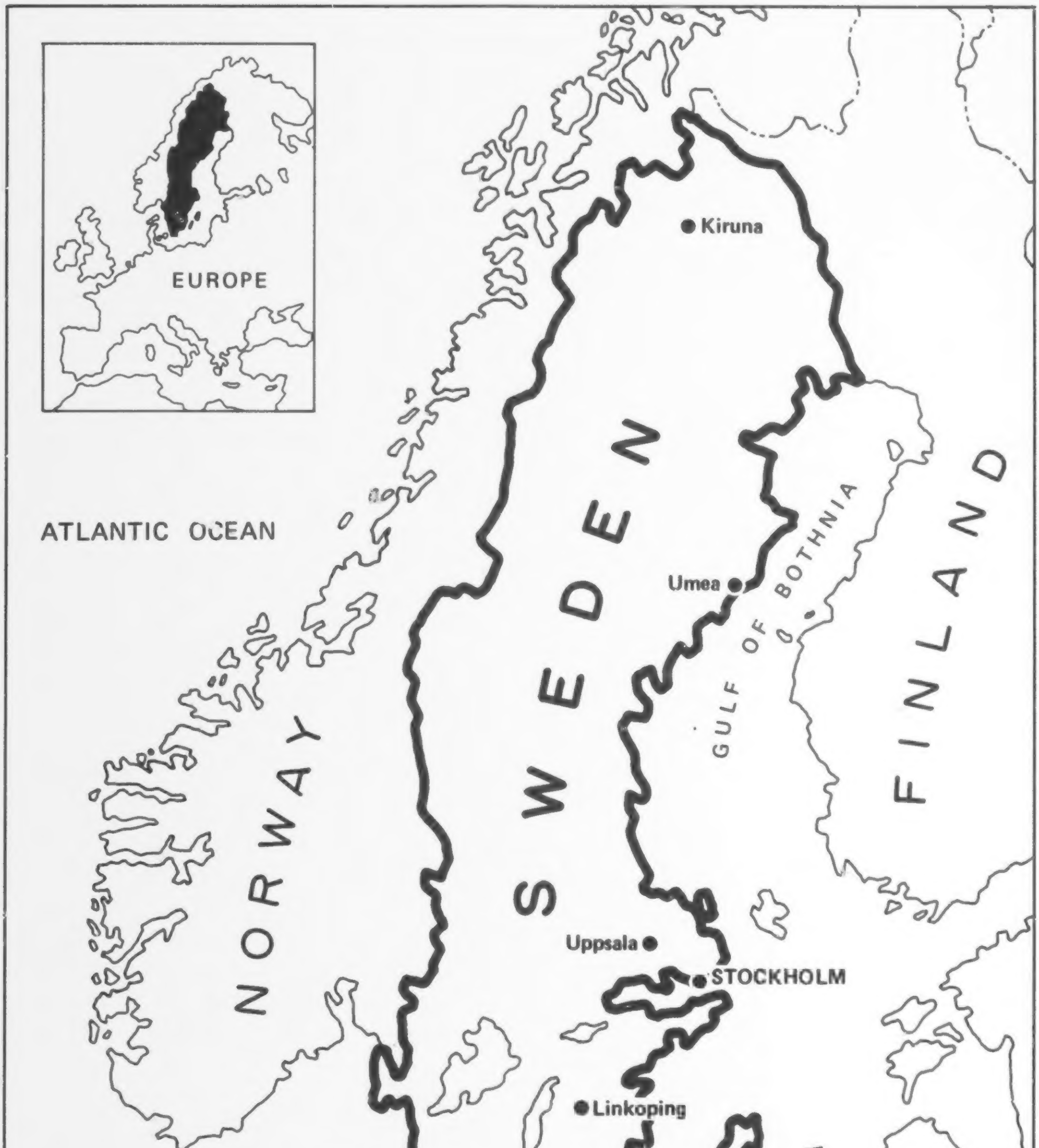
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Sweden Faces Zero Population Growth

By **Murray Gendell**
Georgetown University

Dr. Gendell is Professor of Sociology at Georgetown University, Washington, D.C. He is also Director of the M.A. Program in Demography and a staff member of the Center for Population Research in The Kennedy Institute of Ethics at Georgetown University. He received his Ph.D. in sociology from Columbia University. Married to a Swede, he has studied in Sweden and been a frequent visitor. He is the author of Swedish Working Wives *(Bedminster Press, 1963) and numerous papers on various aspects of family demography.*

Dr. Gendell acknowledges the assistance of the staff of the Swedish National Central Bureau of Statistics in providing material for this Bulletin, *particularly Mr. Arne Arvidsson and Dr. Anne-Marie Bolander. Mr. Dag Swenson of the National Board of Health and Welfare and the staff of the Swedish Embassy in Washington, D.C., were also helpful. Dr. Gendell is also grateful to his colleague Conrad Taeuber for useful comments on the manuscript and to the editor [illegible] the* Population Bulletin, *Jean van der [illegible], whose patience was as great as her energy and enthusiasm.*

Located in Northern Europe on the eastern half of the Scandinavian peninsula, Sweden shares boundaries with Finland to the east and Norway to the west, with Denmark close by across the Kattegat Sea to the southwest. Its land area is about the same as California's and population density a low 52 persons per square mile, compared to 61 in the United States. The 1980 population is estimated at 8.3 million people (a little less than that of North and South Carolina). Virtually the entire population lives in the southern half of the 1,000-mile-long country and 83 percent in "densely populated areas" of at least 200 persons.

Historically, Sweden's population has been extremely homogenous. The only ethnic and linguistic minorities residing in the country for any length of time have been the Lapps, now numbering about 10,000, a Finnish-speaking group of some 40,000 in 1970, and a few thousand gypsies. Officially, all but a few percent of Swedish citizens are Protestants belonging to the Lutheran state church, but Sweden is a very secular society; in 1968, for example, only 2 percent of the population attended church at least once a week. The country is a constitutional monarchy with a long tradition of parliamentary government. A one-house parliament replaced the two-chamber system in 1971. The Social Democratic Party held the majority in the government for 44 years until 1976, the longest governmental dominance of any European political party in this century. Since then the parliamentary majority has been held by varying coalitions of right-of-center "bourgeois" parties.

For the outsider, Sweden provokes a mix of admiration, envy, and curiosity. Its infant mortality rate is lowest in the world and life expectancy surpassed only by that of Iceland. The country has managed to remain aloof from all wars since 1814 and is abundantly endowed with such valuable natural resources as iron ore, timber, and hydroelectric power. Its people enjoy the world's seventh highest per capita income ($10,210 in 1978, ahead of the U.S. at $9,700), no slums and little poverty, an unemployment rate of 2 percent, and one of the world's most comprehensive systems of social welfare. A wide range of child and family allowances, health provisions, free education through university, and retirement benefits protect its citizens and foreign residents alike from cradle to grave. And Sweden has been a forerunner in promoting equality for women.

It has also been a forerunner in changing lifestyles. By 1978, Sweden led all industrialized countries in the proportion of cohabiting couples who were unmarried (15 percent) and the percentage of total births borne out of wedlock (36 percent). But socially, as well as legally, Sweden has erased all distinctions between children born in or out of wedlock.

Sweden is also among the dozen or so European countries where annual births have now dropped virtually to or below the numbers of annual deaths. Its unease with this state of affairs, like that of several of its neighbors, may presage concerns which the prospect of zero population growth could arouse among other developed countries, such as the U.S., where fertility is now below the level needed to replace the population in the long run. (Twenty-four countries population currently have a replacement-level total fertility rate of 2.1 births per woman or lower.* For some, such as the U.S. where the total fertility rate in 1979 was about 1.85,[1] such a low rate is a recent phenomenon. Past higher levels of fertility, like the baby boom, mean that there are still considerably more people in or about to enter the childbearing ages than there are at older ages. It will take several decades of sustained fertility at two births or fewer per woman before the disproportion in the relative size of different age cohorts disappears and annual births—persons "entering" the population—come down to the level of annual deaths—persons "leaving" the population—and the population stops growing from "natural increase." In most Northern and Western European countries, however, fertility has been low enough for long enough that zero population growth—leaving immigration out of account—is already here, or all but. Fertility has recently risen *above* replacement level in Eastern Europe, except for East Germany and Hungary, in response to deliberate pronatalist government policies. Fertility has also taken a turn upward in the U.S.S.R. and now stands at about 2.4 births per woman because of continued high fertility among Central Asian non-Russian peoples who comprise an increasingly large portion of the total U.S.S.R. population.)

Birth rates also fell to record lows in Sweden in the early 1930s during the Depression as they did in most industrialized countries. Sweden's response then was characteristically groundbreaking. The 1934 publication of *Crisis in the Population Issue* by Gunnar and Alva Myrdal touched off a public debate concerning the threat of "self-perpetuating liquidation of the people." Two successive government commissions on population were appointed to make recommendations aimed at promoting a level of fertility which "would keep the population in the long run at least constant, with mortality as low as possible." The programs that resulted, however, were set within a broader social and economic context that still stands as a model for governments concerned about the total quality of life of their peoples.

Measures adopted by Sweden's parliament in the late 1930s and 1940s to strengthen the family (and, coincidentally, fertility) included child, marriage, and housing allowances, low-cost (and now free) maternity and child health services, maternity benefits, day-care centers, free school lunches, and guaranteed job security for women workers who marry or become pregnant. At the same time, steps were taken to eliminate unwanted childbearing: most restrictions on contraception were repealed, the abortion law was substantially liberalized, and sex education was introduced in schools.

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*Canada and the United States, in North America; in Europe: Austria, Belgium, Denmark, Finland, France, East Germany, West Germany, Hungary, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Sweden, Switzerland, United Kingdom, Yugoslavia; and Australia and Japan. Plus two less developed countries: Cyprus and Singapore.[2]

Whether or not encouraged by these policies, birth rates rose in Sweden during the 1940s and again in the 1960s as in most European countries and population concerns subsided. By the mid-1970s, however, concerns flared again as fertility fell well below replacement level. At the same time, the death rate rose slightly. In 1979, the crude birth rate was 11.6 and the death rate 11.0 per 1,000 population (compared to 15.8 and 8.7, respectively, in the U.S.). Sweden's current "medium" official projection foresees a steadily declining population as from about 1986.

The new public and parliamentary debate focuses on the consequences of sustained low fertility for the proportion of elderly people who must be supported and the role played by immigration in population growth. If fertility remains below replacement as now projected, the proportion of persons 65 and older in the population is due to rise from today's 16 percent to 20 percent in 2025. Costs of generous retirement and medical benefits for the elderly already make up close to half of Sweden's very large social welfare bill and are escalating much faster than those for other items in that bill. Immigration plus natural increase among immigrants accounted for nearly half of Sweden's population growth from 1944 to the mid-1970s and by 1979 accounted for all of the low annual growth of 0.2 percent. Among Swedish citizens, there have been fewer births than deaths every year since 1975. Following World War II and until the 1970s, Sweden needed foreign workers to maintain economic expansion and, in line with its well-known humanitarian instincts, welcomed substantial numbers of refugees. However, integrating the newcomers with their different languages and cultures into the formerly highly homogeneous Swedish society has presented problems which have not yet been successfully resolved, despite a far-ranging, conscientious policy effort. Reducing immigration would mitigate these problems and, indeed, controls on non-Nordic immigrants have been tightened. But if immigration is now discouraged and fertility remains low among native Swedes, the country's population may well decline sooner and faster than projected.

In a world beset by rapid population growth, many Swedes are uncomfortable at the thought of stimulating population growth at home. Sweden was a pioneer in the international family planning movement and the first developed nation to provide family planning assistance to the less developed world (beginning with a pilot project in Ceylon in 1958). Nevertheless, low fertility has increasingly captured the attention of the press and parliament in recent years. No new legislation designed to influence population growth trends has so far been enacted but, if the birth rate continues to fall, such action seems likely.

To set these concerns in context, this *Bulletin* opens with a sketch of Sweden's past population growth and as projected for the future. Recent trends in fertility and marriage are then described along with the changes in women's status and availability of modern contraception and legal abortion that have probably influenced them. Sections follow on mortality trends, the aging of the population and the problems this causes, and on immigration trends and policy. The conclusion takes a closer look at the current population debate and the extent to which Sweden's situation resembles what might be expected of a "ZPG" society.

Table 1. Components of Population Growth in Sweden: 1751-1979

	Number per 1,000 population							Mean population for period or at end of specified year (000s)
Year	Births	Deaths	Natural increase	Immigration	Emigration	Net migration	Population increase[a]	
1751-1800	33.6	27.4	6.2				5.5	2,066
1801-1850	32.2	23.9	8.3				8.1	2,790
1851-1900	30.0	18.5	11.5		4.2		7.6	4,343
1901-1950	19.4	12.5	6.9	1.6	2.0		6.4	6,001
1955	14.78	9.45	5.33	4.14	1.75	2.39	7.53	7,290
1960	13.66	10.04	3.62	3.49	2.02	1.47	4.79	7,498
1965	15.88	10.11	5.77	6.41	2.07	4.35	10.00	7,773
1970	13.70	9.95	3.75	9.61	3.56	6.05	9.83	8,081
1971	14.14	10.21	3.93	5.26	4.88	0.38	4.30	8,115
1972	13.82	10.35	3.47	3.68	5.12	−1.44	1.93	8,129
1973	13.48	10.53	2.95	3.62	4.96	−1.34	1.48	8,144
1974	13.46	10.58	2.89	4.59	3.47	1.11	3.91	8,177
1975	12.65	10.77	1.88	5.39	3.33	2.06	3.87	8,208
1976	11.96	11.03	0.93	5.53	3.10	2.43	3.34	8,236
1977	11.64	10.69	0.95	5.33	2.55	2.78	3.70	8,267
1978	11.27	10.84	0.43	4.37	2.68	1.69	2.08	8,284
1979	11.56	10.97	0.59	4.46	2.77	1.69	2.29	8,304

Sources: 1750-1950: National Central Bureau of Statistics (NCBS), *Historical Statistics of Sweden*, Part I: *Population 1750-1950* (Stockholm: 1955) p. 37; 1955-1978: NCBS, *Population Changes 1978*, Part 3 (Stockholm: 1980) Tables 1.1 and 2.1; 1979: Press release from the NCBS in *The Swedish American Newspaper* (Chicago), January 23, 1980, p. 1.

[a] Natural increase plus net migration should equal population increase. Minor discrepancies are due to transfers of persons with "residence unknown" to and from the population register.

Population Growth in Perspective

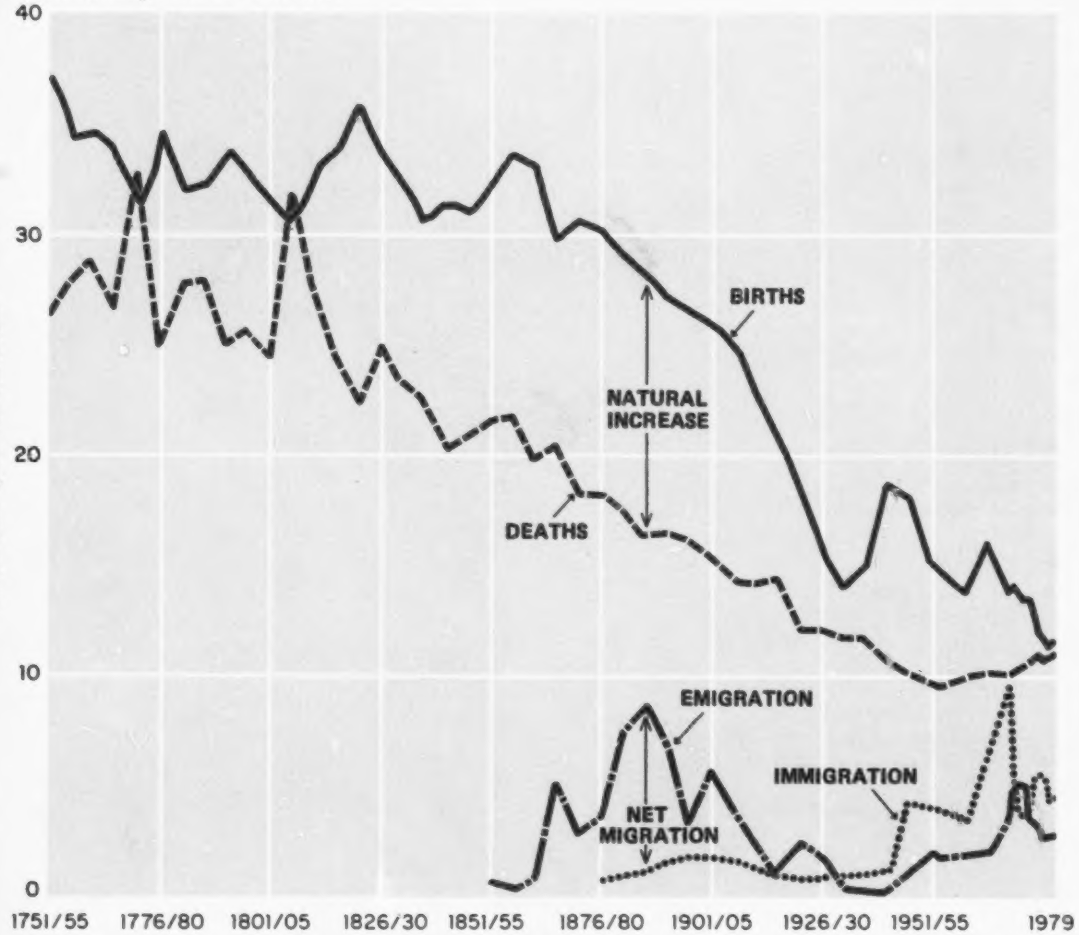
Sweden, together with Finland, has been collecting national population statistics continuously since 1749, longer than any other country in the world. The population totaled just under 1.8 million at that time. For the next two centuries it grew at an average long-run rate of about 7 per 1,000 people or 0.7 percent per year, a rate that doubles a population's numbers in 100 years. Thus in 1850 the population was 3.5 million and doubled again to 7.0 million a century later in 1950. Since then, the growth rate has varied widely, with low levels being reached in the 1970s. In 1979 it stood at just 2.3 per 1,000 or 0.2 percent, as seen in Table 1. Sweden's 1980 population is estimated at 8.3 million.

Population growth is determined by the difference between annual births and deaths (natural increase) and between immigrants arriving in a country and people moving out (net migration). Shifting trends in these four factors have added up to considerable fluctuations in Sweden's historical population growth even though that growth has averaged out broadly to about the same over most of the two and a quarter centuries since 1750. Table 1 gives the details on rates of natural increase, net migration, and total population increase together with population size by half century from 1751 to 1950 and for specified years since then. The trends in birth, death, and migration rates are illustrated in Figure 1.

From 1751 to 1800, the birth rate averaged a relatively high 34 per 1,000 population (similar to the current rate in Mexico, for example, where the birth rate has fallen sharply in recent years) and the death rate was only about 6 points lower. (There is no reliable estimate of migration until the mid-19th century.) The next half century saw the start of Sweden's long-term demographic transition from high to low birth and death rates. The death rate began its sustained decline (although this was interrupted by epidemics as seen in Figure 1), initiating the rapid-growth phase of the transition. But the drop in mortality was modest, and with the birth rate also falling slightly, the rate of natural increase went up only from 6 to to 8 per 1,000.

It was in the latter half of the 19th century that the rate of natural increase

Figure 1. Birth, Death, Immigration, and Emigration Rates: Sweden, 1751-1979



Source: Carl Johan Åberg and Allan Nordin, *Befolkning och ekonomi* [Population and the Economy] (Stockholm: Trygg-Hansa, 1977) Diagram 3.1., p. 23, updated from data in Table 1.

accelerated to its half-century peak of 11.5. As a result, "overpopulation" built up in the poor rural areas, as in many other European countries at the time. The response was an epidemic of "America fever"—particularly during the 1880s and 1890s. With the large volume of emigration, the actual rate of population growth averaged just under 8 per 1,000 from 1851 to 1900, about the same as in the preceding half century. Another important development during this period was the beginning of the sustained decline in fertility, about 1880.[3]

The main features of Sweden's demographic history since 1900 are a continuing fall in the birth rate to very low levels, relieved by some upward movement in the 1940s and 1960s, and a marked shift in the migration balance from emigration to immigration, particularly after World War II.

During the economic depression and mass unemployment years of the 1930s, emigration dwindled to virtually zero, immigration was scarcely higher, and the birth rate dropped to a low of about 14 per 1,000. With the death rate down to 11.7 per 1,000 by this time, population growth averaged a very low 0.4 percent per year.

The birth rate climbed again with improving conditions in the 1940s and again in the early part of the 1960s. Since the 1965 level of close to 16 per 1,000, however, it has dropped almost uninterruptedly, reaching an alltime low of 11.3 in 1978 and then rising a bit to 11.6 in 1979. (The lowest recorded birth rate prior to this was 13.7 in 1933 and 1934.) The death rate, meanwhile, after fluctuating around 10 per 1,000 in the 1950s and 1960s, rose after 1970, despite continued declines in age-specific death rates. This is because an increasing proportion of Sweden's population is now composed of the elderly among whom death is more likely. In 1979, the death rate stood at 11.0 per 1,000. Thus Sweden's rate of natural increase in 1979 was 0.59 per 1,000 population, or less than 0.1 percent.

This low figure is matched by most of Sweden's neighbors. Natural increase averaged 0.1 percent in Northern and Western Europe in 1978. The only major exceptions were Iceland at 1.2 percent and Ireland at 1.1 percent. Although also dropping in other developed regions of the world, the rate of natural increase in 1978 was a higher 0.7 percent in Southern and Eastern Europe and in Canada and the United States. In the U.S.S.R., Australia, and New Zealand, it was 0.8 percent, and in Japan, 0.9 percent. In *less* developed countries as a whole, natural increase now averages 2.0 percent.[4]

That Sweden's population growth rate has not yet turned negative is thanks almost entirely to immigration. Immigration began to outstrip emigration already in the 1930s, but not substantially so until after World War II when the economy began to expand and Sweden sought workers from abroad (see Figure 1). Since 1950 there has been a net migration gain every year except 1972 and 1973. Fluctuating with the Swedish business cycle, the gain has ranged generally between 1.0 and 2.5 per 1,000 population. From 1944 through 1977, 29 percent of the Swedish population growth of 1.74 million was accounted for by net immigration. The natural increase of the immigrants, it has been estimated, produced an additional 17 percent of the growth. Thus, almost half of Sweden's population increase between 1943 and 1978 resulted directly or indirectly from net immigration. And during the 1970s, with natural increase reduced almost to zero, the net gain from international migration has come to account for much more of population growth than has natural increase. This is unprecedented.

Population projections 1978-2025

In its most recent population projections, the Swedish National Central

Bureau of Statistics uses three alternative assumptions in projecting fertility and two in estimating future migration.[5] Only one trend was selected for mortality, since it was assumed that age-specific death rates would remain unchanged from 1977, except for slight declines between 1977 and 1985 among men over 80 and women older than 50. As a result, average life expectancy is projected to increase only from 72.1 in 1977 to 72.2 years in 1985 for males and from 77.9 to 78.6 for females and remain constant thereafter.

One of the migration assumptions supposes an annual net gain of 10,000 throughout the 1978-2025 projection period, resulting from an annual immigration of 35,000 and emigration of 25,000. The other alternative assumes the same annual gain for 1978-1984 but zero net immigration from then on as a result of an annual balance of 30,000 immigrants and 30,000 emigrants. This second alternative is regarded as more likely.

The medium and main alternative for fertility assumes that the total fertility rate (TFR) will increase from 1.64 births per woman in 1977 to 1.80 in 1985 and remain constant thereafter to 2025. (The total fertility rate is explained in the next section.) The high alternative calls for the TFR to increase to 2.1 (the replacement level) by 1985 and the low alternative assumes a continued decline to 1.5 by 1985. Both would then stabilize at those levels to the end of the projection period.

The effect of the main assumptions (a TFR of 1.8 and zero net immigration) is that Sweden's population is expected to inch up only from 8.27 million at the end of 1977 to a maximum of 8.36 million by the end of 1986. From then on the numbers would decline, reaching 8.27 million—the 1977 figure—by the beginning of the next century. Then the decline would accelerate so that by 2025 there would be less than 7.8 million people in Sweden. If the low 1.5 TFR assumption were to materialize, with no net immigration, there would be 7.9 million by the turn of the century and less than 7 million by 2025. With an annual net immigration of 10,000, these totals would be larger by about 200,000 in 2000 and 400,000 in 2025.

To fill in the details of this population picture, we turn first to recent fertility trends.

Fertility Trends

As noted, Sweden's crude birth rate (CBR) fluctuated after the lows of the early 1930s: up during the 1940s, down again somewhat in the 1950s, and up in the early 1960s. Since 1964 it has fallen almost uninterruptedly from just over 16 births per 1,000 population to 11.6 in 1979.

The crude birth rate is determined by the number of women in the childbearing ages—ages 15 to 44 or 49—and by the rate at which these women reproduce. The number of annual births per 1,000 women in the childbearing ages is called the general fertility rate (GFR). The decline in Sweden's CBR since 1964 has resulted from a pronounced drop in the GFR. In 1956-60, the GFR was 71.2 births per 1,000 women aged 15-44. It then rose to about 79.5 in 1964-66. But by 1978 it had fallen to 56.7. (In the United States in 1978, the GFR was 66.4.) Because of the higher birth rates of the 1940s, the number of women in the reproductive ages began to rise as from the mid-1960s. If the GFR had remained constant at the 1964 level of 79.5, there would have been 131,000 births in 1978 rather than 93,000—about 40 percent more. Correspondingly, the CBR would have been 15.9 per 1,000 population instead of 11.3.

A better measure than either the crude birth rate or the general fertility rate for tracing fertility trends over time is the total fertility rate (TFR). This measure is the sum of the rates at which women in each single year of age from ages 15 to 44 or 49 bear children in a

Table 2. *Age-Specific and Total Fertility Rates of Swedish Women: 1901-1978*

(Births per year per 1,000 women)

Period or year	Age of women 15-19	20-24	25-29	30-34	35-39	40-44	45-49	Total fertility rate per 1,000	Total fertility rate per woman
1901-05	15.9	119.5	193.3	193.6	159.7	87.8	11.4	3,906	3.9
1906-10	18.9	121.9	186.3	186.5	149.3	78.9	10.0	3,759	3.8
1911-15	19.5	113.3	163.3	158.3	130.4	69.2	8.1	3,331	3.3
1916-20	16.9	105.5	148.7	140.0	111.0	58.7	7.3	2,941	2.9
1921-25	17.9	97.2	132.2	120.3	93.5	48.2	6.0	2,577	2.6
1926-30	17.8	83.0	106.3	95.0	72.6	36.5	4.4	2,078	2.1
1931-35	17.8	76.2	93.4	80.8	56.1	25.7	3.0	1,765	1.8
1936-40	19.9	83.6	100.4	83.2	53.4	21.8	2.3	1,823	1.8
1941-45	25.6	111.4	134.0	107.5	66.8	23.6	1.9	2,354	2.4
1946-50	36.4	127.4	138.0	103.1	62.1	22.0	1.8	2,454	2.5
1951-55	37.8	128.2	128.3	86.8	47.8	15.9	1.3	2,231	2.2
1956-60	36.7	132.5	136.9	85.5	42.3	12.9	0.9	2,239	2.2
1961-65	42.8	136.9	148.9	87.6	39.3	10.7	0.7	2,335	2.3
1966-70	41.9	127.2	137.3	77.1	32.2	7.6	0.5	2,119	2.1
1971-75	32.0	121.8	128.7	67.0	23.6	4.7	0.2	1,890	1.8
1975	28.8	115.0	123.3	64.1	20.7	3.7	0.2	1,779	1.8
1976	25.0	107.1	118.8	62.4	20.5	3.6	0.2	1,688	1.7
1977	22.1	103.6	117.9	61.5	20.7	3.6	0.2	1,648	1.6
1978	19.2	97.1	116.0	62.4	21.6	3.7	0.1	1,601	1.6

Sources: 1901-1975: National Central Bureau of Statistics, *Population Projection for Sweden 1976-2000 (Information i prognosfrågor 1976:3)* (Stockholm: 1976) p. 11; 1975-1978: National Central Bureau of Statistics, *Population Changes 1978*, Part 3 (Stockholm: 1980) Table 3.16.

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given year (or the sum of the rates by five-year age groups multiplied by 5). Since these age-specific rates are all expressed as the number of births per 1,000 women in each age category, the TFR—unlike the GFR—is not influenced by how many women there happen to be in a given year in the 20-29 year-old age group, the ages at which age-specific fertility rates are generally highest. Nor is the TFR influenced by how many women there are altogether aged 15 to 44 or 49 in that year, which affects the crude birth rate.

From Table 2 we see that Sweden's TFR fell from 3,900 per 1,000 women 15-49 years old at the beginning of the 20th century to less than half that rate, about 1,800, during the 1930s. It then rose to a peak of 2,450 in the late 1940s, sagged a bit in the 1950s, and climbed back to over 2,300 in the early 1960s. It has been falling ever since. In the early 1970s, the TFR was about 1,900. By 1978, it was down to an all-time low of 1,600, or 1.6 per woman. (The U.S. total fertility rate in 1978 was 1,765 per 1,000 women aged 15-44, or just below 1.8 per woman.)

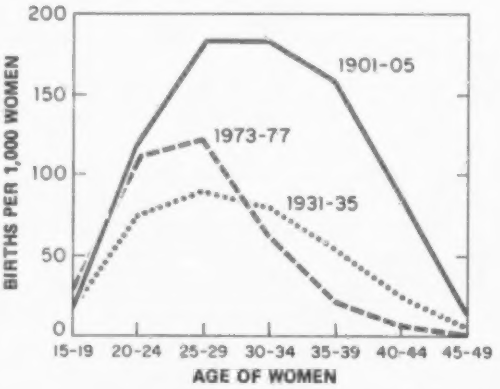
If Swedish women were to continue to bear children at the rate that all women in the reproductive ages actually did in 1978, each would end up with an average well below the level necessary to exactly replace each adult in the population. An annual TFR of 2.1 children per woman would have to be sustained in order for births and deaths to be in balance under the low mortality conditions prevailing in Sweden, leaving migration out of account. (Why not 2.0 —one child for each parent? Because, to ensure replacement, every woman on average must have a daughter and for every 100 female babies born alive in Sweden there are 106 male infants born alive, an average of 206 boys and girls per 100 women, or 2.06 per woman. In addition, compensation must be made for the few female infants who fail to survive to reproductive age.)

The TFR was also below replacement level in the 1930s but rose above replacement in the next three decades. The current TFR of about 1.6, however, is more than 10 percent below the 1.8 of the 1930s and one wonders if Sweden's TFR will again climb to replacement level. As we have seen, the current "medium" official population projection, regarded as the most likely, assumes that the TFR will rise slightly to 1.8 in 1985 and remain constant thereafter. If that happens, overall annual births would dip below deaths already in 1986 and if the loss is not made up by net immigration, the country's population would begin to decline.

Childbearing concentrated

Table 2 also shows that the age pattern of Swedish women's fertility has changed markedly. By the 1970s, childbearing had become concentrated among women in their twenties. Except during the 1940s, age-specific fertility rates among women 35 and over have declined steadily throughout the 20th century and were almost nil among women in their forties by the early 1970s. Although not quite as pro-

Figure 2. Age-Specific Fertility Rates: Sweden, 1901-05, 1931-35, 1973-77



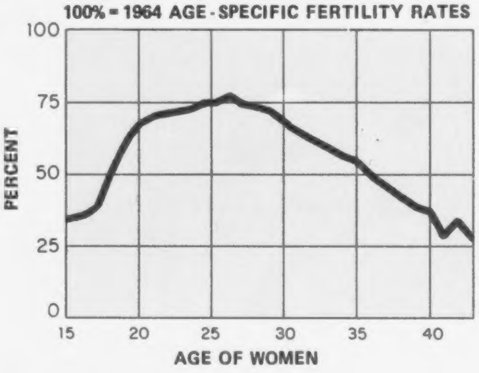
Source: National Central Bureau of Statistics, *Population Projection for Sweden 1978-2025 (Information i prognosfrågor* 1978:5) (Stockholm: 1978) Diagram 2.4, p. 12.

nounced, the decline was similar among women 30-34 years of age. Among women aged 15-19, fertility rates rose in the decades following the 1930s but by 1978 had fallen back to the low levels of the early 20th century.

As may be seen in Figure 2, the change between the beginning of the century and the low point of the early 1930s was mainly the large drop in the overall level of fertility. There was only a modest shift in the age pattern of childbearing toward women aged 20-29. Between then and the mid-1970s, however, fertility became markedly concentrated in this age group. The TFR was about the same in the 1973-77 period as in 1931-35.

Figure 3 shows details on this shift for 1964-77. For women aged 20-29, fertility rates in 1977 were about 75 percent of what they were in 1964. For older and younger women, however, the drop was much greater. By 1978, only 5.4 percent of total Swedish births were accounted for by teenage women, a remarkably low figure compared to the U.S. where 17 percent of all births in 1977 were to teenagers.[6] Two-thirds of all Swedish births in 1978 occurred to women in their twenties (Table 3). For mothers and babies, these are the most favorable ages for childbearing and this concentration has played a role in reducing the Swedish infant mortality rate to the lowest in the world (see later section on "Mortality Trends").

Figure 3. 1977 Age-Specific Fertility Rates as Percentage of 1964 Rates



Source: See Figure 2, Diagram 2.6, p. 13.

Cohort versus period fertility

The TFR for a given year or period is not the same as the completed fertility rate—the number of children which a group of women born at the same time (a birth cohort) actually had on average by the end of their childbearing years at about age 50. As seen in Figure 4, actual completed fertility in Sweden has hovered around 2 births per woman from the 1895 birth cohort onward. The level was below this for women born in the first decade of this century who were in their prime childbearing years during the Depression years of the 1930s and slightly higher for women born between 1920 and 1935 whose childbearing came mostly in the 1940s, 1950s, and early 1960s. It is too soon yet to know what the final average will be for women born from 1945 on. So far, however, they

Table 3. Distribution of Births by Age of Mother: Sweden, 1955-1978

(Percent of total births)

Age of mother	1955	1960	1965	1970	1976	1978
Under 20	7.8	9.5	12.1	8.3	6.6	5.4
20-29	55.7	57.9	62.1	69.9	68.0	65.6
30 and over	36.5	32.7	25.8	21.8	25.4	29.0

Sources: 1955-1976: United Nations, *Demographic Yearbook*, various editions; 1978: National Central Bureau of Statistics, *Population Changes 1978*, Part 3 (Stockholm: 1980) Table 3.3.

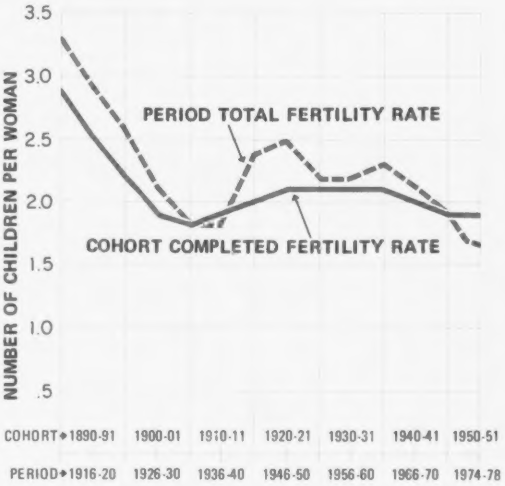
have had fewer births in their twenties than women born just before them and it is likely that they will average a completed fertility rate that is again just below 2 births per woman.[7]

Sweden's TFR has varied much more sharply than the cohort completed fertility rate, as also seen in Figure 4. In contrast to the *completed* fertility rate of a birth cohort of women, the TFR is a "period" measure which sums up the childbearing experience of all women from different birth cohorts who happen to be in the childbearing ages in that period or year. It is thus affected by the *timing* of cohort fertility, or the ages at which women are having children. Because the TFR reflects the birth rates of a particular period, it is more directly related to the rate of population growth of that period than the cohort completed fertility rate.

During the early 1930s, Sweden's TFR fell as a result of a decline in age-specific fertility rates at all ages, as seen in Table 2. As economic conditions improved, women who had delayed childbearing made up for lost time and age-specific rates rose among older women. For example, in 1931-35, women then aged 20-24 had a fertility rate well below the rate of women that age five years earlier—76.2 compared to 83.0 births per 1,000. Five years later (1936-40), these same women at ages 25-29 had a higher rate than women that age had had in the preceding five years—100.4 versus 93.4. And their fertility in 1941-45 at ages 30-34 was again higher than that of women born immediately before them—107.5 compared to 83.2.

Younger women (born in the 1920s) also responded to improved economic conditions in the later 1930s and 1940s with higher age-specific birth rates than women in their twenties had during the Depression. The result of this overlapping of the two age patterns of childbearing was an increased TFR during the 1940s—considerably higher than the completed fertility which these different cohorts of women eventually had.

Figure 4. Period Total Fertility Rate and Cohort Completed Fertility Rate: Sweden, 1890-1978



Source: National Central Bureau of Statistics, *Barn—behov eller börda?* [Children—need or burden?], *Urval* No. 11 (Stockholm: 1979) Diagram 3.1, p. 34.

The downswing in the TFR in the 1950s was partly the result of the previous increase. Women who had advanced their childbearing into their twenties during the 1940s tended to offset this by lower age-specific fertility rates at older ages than women born just before them. The same trend probably explains something of the downturn in the TFR since 1964. Fertility rates among women in their twenties continued to increase until 1965 (Table 2) and were quite likely to decrease later among these same women as they grew older. Since 1965, however, the TFR has also been depressed by a decline in fertility rates among women in their twenties—those women born in the late 1940s and 1950s. It remains to be seen if this decline represents a delay in childbearing that will later be made up—as happened among older women in the 1940s—or if these women will end up with a completed fertility rate lower than that of any cohort before them. Also uncertain is what the timing and level of fertility will be among women entering their childbearing years during the 1980s and 1990s.

Besides shifts in the timing of childbearing, another important demographic factor underlying TFR trends of the past four decades is Sweden's changing pattern of marriage.

Marital Status

In most societies births occur preponderantly within marriage and fluctuations in the proportion of men and women who are married, especially in the prime reproductive ages, have a considerable impact on fertility. The marked changes in this proportion in Sweden during this century parallel trends in the fertility rates.

Up through 1930, only one-fifth of women aged 20-24 were married and not quite half of women aged 25-29, as seen in Table 4. This reflects Sweden's long tradition of late marriage and much celibacy. During the next two decades, however, the proportion married doubled from 19 to 40 percent among women aged 20-24 and went up by half—from 48 to 72 percent—among women aged 25-29. A more modest increase took place during the 1950s. By 1960, more than three-quarters of women 25-29 were married.

Table 4. Percent of Women Married at Ages 20-24 and 25-29: Sweden, 1900-1978

	Age of women	
Year	20-24	25-29
1900	19.5	47.5
1910	20.1	48.2
1920	19.6	47.9
1930	19.4	47.7
1940	28.2	59.6
1950	39.8	71.7
1960	43.7	77.7
1970	38.2	73.2
1975	23.7	60.1
1976	22.6	57.7
1977	20.8	55.0
1978	18.8	52.0

Sources: National Central Bureau of Statistics (NCBS), *Historical Statistics of Sweden*, Part I: *Population 1720-1950* (Stockholm: 1955) pp. 25-26; NCBS, *Population Changes 1976*, Part 3 (Stockholm: 1977) Table 1.4; NCBS, *Population Changes 1978*, Part 3 (Stockholm: 1980) Table 1.4.

Beginning around the middle of the 1960s, there was a strong reversal back to old marriage patterns. By 1978, the percentage married in these two age groups had dropped to the levels of 1930. The 19 percent married among women 20-24 in 1978 is remarkably low compared to the United States where 51 percent of women that age were or had been married in 1979[8]—the lowest proportion on record for this country.

The shifts in the proportion married are reflected in age at marriage. In 1930, 25.2 was the median age of women at first marriage (half were younger and half older). By 1950, the figure was down to 23.9 and in 1960 it was 22.8. By 1978 it was back up to 24.9 (compared to 21.8 in the U.S. in that year).[9]

The increase in marriage between 1930 and 1960 accounts for much of the rise in age-specific birth rates of all women in their twenties in that period. The sharp fall in the percentage married at these ages since the mid-1960s has also had an appreciable effect, but in the opposite direction.

One reason for these effects is that the age-specific birth rates for all women are the weighted averages of the rates for married and unmarried women. In Sweden, as in most other countries, marital fertility rates among women 20-29 are much greater than the out-of-wedlock rates, as seen in Table 5, although the difference between them narrowed during the 1970s. From the late 1930s to the late 1960s, marital fertility rates for women remained essentially unchanged but because of the increase in the proportion married at these ages, the relative importance of these higher rates increased. As a re-

Table 5. Marital and Non-Marital Fertility Rates for Swedish Women Aged 20-24 and 25-29: 1936-1978

(Births per year per 1,000 women)

Period or year	20-24		25-29	
	Unmarried	Married	Unmarried	Married
1936-40	25	261	17	170
1946-50	31	281	24	186
1956-60	30	267	26	172
1966-70	41	243	34	170
1971-75	68	247	62	161
1976	67	239	69	154
1977	67	237	71	155
1978	63	234	71	155

Source: National Central Bureau of Statistics, *Population Changes 1978*, Part 3 (Stockholm: 1980) Table 3.16.

sult, age-specific rates of all women 20-24 and 25-29 rose considerably in this period.

During the 1970s (through 1978), there was a modest fall in marital fertility rates for these ages and a steep fall in the proportion married. The resulting decline in age-specific fertility rates for all women—from 127 to 97 per 1,000 women aged 20-24 and from 137 to 116 for women 25-29 (Table 2)—would have been much greater if not moderated by a sharp rise in the rates for unmarried women. Fertility rates among unmarried women aged 20-24 rose from 41 to 63 per 1,000 between the late 1960s and 1978 and more than doubled from 34 to 71 among unmarried women aged 25-29 (Table 5).

Non-marital cohabitation

The decline in marriage in Sweden has not meant a commensurate decline in numbers of unions. Beginning sometime during the 1960s, there has been a rapid increase in the popularity of de facto unions. This is not a new phenomenon in Sweden. Consensual unions were quite common in some rural districts in the late 19th and early 20th centuries. They were also frequent among the poor in Stockholm, so much so that they were dubbed "Stockholm marriages."[10] How frequent such unions were throughout the country is not known.

As recently as the 1950s, however, only an estimated one percent of cohabiting couples in Sweden were unmarried. But at the end of the 1960s the proportion was up to 7 percent. The 1975 census reported about 11 percent, a figure the National Central Bureau of Statistics believes is probably too low. In 1978, a government report put the figure at 15 percent.[11] The sudden increase in de facto unions is not peculiar to Sweden but among countries for which there are recent estimates, the level is highest in Sweden. It was 13 percent in Denmark in 1977, 8 percent in Finland in 1978, and much lower, though increasing, in Norway, France, and the United States (2.3 percent in 1978).[12]

So far, non-marital cohabitation has been adopted mainly by young adults, as seen from the 1975 census data shown in Table 6. Among all persons living in a union, the proportion unmarried at ages 20-24 was more than double the level for those in their later

Table 6. Percent Unmarried of All Women and Men in Union: Sweden, 1975

Age	Women	Men
20-24	57	71
25-29	23	35
30-34	10	14
35-39	6	8
20 and over	11	11

Source: National Central Bureau of Statistics, *Barn—behov eller börda?* [Children—need or burden?], *Urval* No. 11 (Stockholm: 1979) p. 42.

twenties (57 compared to 23 percent for women and 71 versus 35 percent for men), and diminished rapidly with increasing age. Close to 30 percent of all women aged 20-24 were living in a nonmarital union in 1975 and only 22 percent were married. In 1965, 40 percent of women in their early twenties were married. (The 1965 census did not ask about non-marital cohabitation.) Among men aged 20-24, 19 percent were cohabiting and only 8 percent were married in 1975; 18 percent of men this age were married in 1965.[13]

Sweden has long had a permissive attitude toward premarital sex. This has its roots, according to Alva Myrdal, in a historical rural custom that tolerated premarital sexual relations under specific conditions such as "night courtship."[14] The permissive tradition was later enhanced by "the far-reaching secularization of Sweden that occurred along with industrialization in the late 19th and early 20th centuries," and particularly the egalitarianism of Swedish society. As sociologist Richard Tomasson puts it: "When women's roles are characterized by a high level of equality with men [as they are in Sweden]. . . . there is likely to be a permissive sex ethic."[15] And he points out that sex education—which now stresses the social and ethical as well as biological aspects of sex[16]—has been compulsory at all grade levels in Swedish schools since 1956.

These factors alone, however, can hardly explain why so many young Swedish couples have suddenly taken to actually living together without benefit of matrimony. Swedish demographer Erland Hofsten sees the "growing mobility" of the population, more available housing, and the "rapidly growing independence of women, visible in the increasing number of economically active women" as important in "making the situation ripe for a change in marriage habits."[17] But to explain the suddenness of the change, he adds, "we must obviously look for something which occurred in the late 1960s." Danish demographer Mogens Boserup stresses here the "new youth movement" which swept Western nations, challenging "traditional rules . . . with regard to social behavior."[18] More important, Hofsten feels, were liberalization of abortion and the introduction about this time of efficient contraceptives such as the pill, "easy to apply and available to all [which] imply that sexuality finally and conclusively is disassociated from procreation. When it becomes clear to young people that they can live together without any risk of an unwanted pregnancy, that must have consequences for the behavior of young men and women. Why marry, if a child is not planned anyway for the time being? And if it proves possible to live in a consensual union without marrying, why not continue to do so also after a child has been born?"[19]

That many young Swedish people may view cohabitation as trial marriage is suggested by a 1975 survey of unmarried couples in their twenties in the neighboring country of Denmark. About one-third said they regarded living together as a period of experimentation and about one-seventh indicated that it was economically an advantage; but another third simply felt legal formalities were unnecessary.[20]

Fertility among cohabiting Swedish

women is about half that of married women to judge from 1975 census data. The average number of children already born per woman was:[21]

Age	Married (living with husband)	Cohabiting
20-24	1.0	0.5
25-29	1.6	0.8
30-34	2.0	0.9

So long as informal unions are viewed as trial marriages and likely to be unstable, this differential is bound to persist. Thus the increasing preference for such unions, if it also persists, could further depress the birth rate.

Out-of-wedlock births

It would also mean a continued increase in the proportion of out-of-wedlock births. Only a tenth of births were out of wedlock in the 1940s and 1950s. The figure rose during the 1960s and was about 18 percent in 1970. In the next eight years there was a doubling to 36 percent in 1978.[22] This figure was a much lower 16 percent in the U.S. in 1978 although the proportion of out-of-wedlock births has also risen rapidly in this country in the past decade or so.[23]

It should be noted that the stigma attached to out-of-wedlock births has long been much less in Sweden than in the U.S. The stigma has weakened in both countries but the gap has not closed. Recording of births by legitimacy status is still required in most U.S. states but has been abolished in Sweden, for example. And Swedish children born outside marriage have the right to receive maintenance from both parents, inherit from both, and adopt either surname. They and their parents receive all social welfare family benefits. There is even an "advance allowance" of 4,700 crowns a year (about $1,100) paid to a child of unmarried (or divorced) parents who lives with only one of them, in case the other parent does not contribute at least this amount.

Divorce

A rapid rise in divorce up to 1975 undoubtedly also played a role in the birth rate decline. For every 1,000 married women aged 30-34, for example, there were 7.4 divorced in 1962, 7.9 in 1965, and 10.9 in 1970. Then the rate more than doubled to 24.5 in 1975 but subsided to 19.6 in 1978. An easing of the divorce law at the beginning of 1974 explains much of the acceleration in the mid-1970s. Divorces went up sharply from 16,000 to 27,000 between 1973 and 1974 and then fell back to 20,000 in 1978.[24] Cohabitation could help lower the divorce rate further in future years if this growing practice serves to prevent many couples from entering into incompatible marriages.

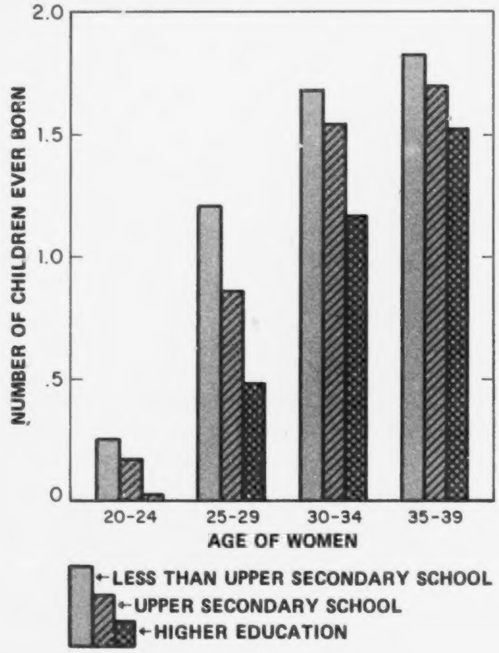
The late 1960s and 1970s have clearly been a watershed period in Sweden with the rapid retreat from legal marriage, the rise in informal unions (accompanied by inflation of the proportion of out-of-wedlock births), and increasing separation of sexuality from reproduction. These trends that have helped depress annual births virtually to the level of deaths are very likely related to the increase in women's education and particularly their increased employment outside the home.

Women's Changing Status

Wherever women's chances for education and gainful employment have come close to those of men around the world, lower birth rates have been the almost inevitable result. In stressing equal rights for women, Sweden has had few rivals.

One observer commented at the end of the 1960s: "A self-conscious ideological emphasis on equality between the sexes in work, education, and in all official areas characterizes Swedish society."[25] During the 1970s, two government committees on equality went

Figure 5. Average Number of Children by Women's Educational Attainment and Age: Sweden, 1976



Source: See Figure 4, Diagram p. 3.14, p. 75.

beyond this to encourage equality also in family life. Legislation has been enacted to encourage men to share childrearing responsibilities. The official theme is that "Both women and men must be enabled to play double roles, i.e. take active part in both family life and working life."[26] New programs have also been designed to draw more women into traditionally male occupations and more men into health and social services and preschool teaching.

In practice, the stress on equality has worked best in the educational sphere and less so in the work world and in the home.

Increasing education

Sweden has nine years of compulsory schooling from the age of seven and virtually all children are enrolled. Enrollment beyond that has increased sharply in the post-World War II period. Among 16-18 year-olds, the proportion attending school rose from 10 to over 60 percent between 1940 and 1970. And among young men and women aged 19-24, the percentage enrolled in colleges and universities went from a mere 5 percent to 30 percent in those 30 years.[27]

Women shared fully in those increases. By 1975, girls aged 16-19 averaged slightly more years of schooling (10.0) than boys that age (9.6).[28] And in both 1965 and 1975, girls were in the majority among new entrants to colleges and universities. Deliberate efforts are made to break down traditional sex-role differences. Boys and girls alike must study domestic science and child care as well as woodworking and metalwork in primary school and a 1975 government report urged that technology be compulsory for girls and that boys should be exposed to nursing in upper grades.[29] When they have a choice, however, young women still lean toward traditional "female" fields and in university tend to choose shorter courses than young men do.

Nevertheless, the continuing increase in educational attainment is likely to reinforce both the decline in fertility and the trend toward increasing proportions of working women. In Sweden, as in the U.S., the more education women have, the lower the average number of children (Figure 5). The relationship between education and employment is strongly positive. Eighty four percent of women aged 25-64 with more than two years of college or university education were working in 1970 compared to only 54 percent of those with less than the nine compulsory years of schooling (Table 7).

Increasing employment

Women's employment rates have soared in all Western nations in the second half of the 20th century. But in Sweden, the flood of women into the paid work force

Table 7. Percent of Swedish Women Aged 25-64 in the Labor Force, by Educational Attainment: 1970

Educational attainment	Percent in labor force
Less than 9 years	54
At least 9 years	61
Upper secondary school	65
Up to 2 years college or university	72
More than 2 years college or university	84

Source: The Joint Female Labour Council, *Woman in Sweden in the Light of Statistics* (Stockholm: 1973) Table 3.7, p. 39.

has outstripped that of most countries.

In 1930, less than a third (31 percent) of Swedish adult women were working, and the proportion declined in the next two decades as marriage rates increased and it remained unfashionable for married women to work. After 1950, however, women's labor force participation rates escalated, reaching over 72 percent among women 16-54 in 1976. In the U.S. in 1978, the rate was 60 percent in the same age group.[30]

Married women and mothers have been in the vanguard of the change. In 1950, only 15 percent of married Swedish women were working or looking for work outside the home. By 1975, a quarter century later, that figure had quadrupled to 60 percent—considerably higher than the 48 percent of U.S. married women in the labor force in 1978. In Sweden, as elsewhere, the more children a woman has and the younger they are, the less likely she is to take a job away from home. Yet the employment rates of mothers of preschool children (under age seven) have increased more rapidly than those of all other women. From the mid-1960s to 1977, the proportion of such mothers who were working went up dramatically from 37 to 66 percent. In 1978 in the U.S., the rate for mothers of preschool children was 42 percent—also representing the swiftest rise in employment rates among all women in recent years.

Continued rapid increase in Swedish women's employment rates are expected. Among mothers aged 20-44 alone, for example, projections for proportions employed range from 72 percent (for those 35-44) to 81 percent (for those 25-34) as early as 1983.[31]

The long-run increase in Swedish women's employment is related to a number of demographic, social and economic changes. As birth and death rates declined, women have had more years to work outside the home after the last of their children passes the ages requiring most maternal attention and have lived longer to take advantage of these years. Women have been more in demand in the labor market as men's employment rates have fallen: with increasing education, young men have been starting work at later ages and after the introduction of pensions in the 1930s and 1940s, older men began retiring earlier than they once did. By 1976, women made up 43 percent of the labor force, up from 35 percent in only the six years since 1970.[32]

There has been tremendous growth in the kinds of jobs that traditionally appeal to married women or for which employers are most likely to hire women: public service jobs especially, office work, and jobs that permit part-time schedules. In recent years, day-care facilities have expanded and tax rules have been changed to permit couples to file separate tax returns, thus lowering their tax rate in Sweden's steeply progressive income tax scale. And with all these changes, coupled with the emphasis on equality for women, social attitudes have changed radically regarding the propriety of wives and mothers going to work outside the home.

Going to work, however, has not guaranteed women economic equality with men. This is primarily because Swedish working women—like their counterparts in the U.S.—are disproportionately concentrated in less remunerative jobs. In 1975, close to half (49 percent) of women in the labor force were employed in relatively low-paying service jobs as secretaries and office workers, nurses, teachers, saleswomen, public health and social workers, and the like. Only 17 percent of employed men worked in the service sector. Just 5 percent of working women had "independent or managerial tasks" in 1975 against 50 percent of employed men.[33] In some professions, however, Swedish women comprise fairly high proportions to judge from the following comparisons with the U.S.:[34]

	Percent female	
	Sweden 1975	U.S. 1977
Lawyers	12	9.5
Physicians	23	10.6
Dentists	30	2.9
Pharmacists	82	17.4

Sweden has also made efforts to guarantee equal pay for equal work. Among industrial workers, for example, the average hourly wage earnings of women increased from 75 percent of men's in 1965 to 86 percent in 1974.

The Swedish Institute: Photo by Hans Hammarsköld

An architect for the City of Stockholm. Swedish married women have flooded into the work force in recent years but relatively few hold well-paid professional jobs.

Constraints and Supports for Women's Dual Role

Clearly Swedish women—like their American sisters—are increasingly opting to both work and have children, just as official policy now holds that they should. Outside employment no longer appears to be as incompatible with motherhood as it once was. But there are still constraints to combining childrearing with employment that make it likely that most Swedish women will continue choosing to have only one or two carefully timed children.

Unlike the U.S., Sweden has a comprehensive public program of day care for small children for which parents pay from 3 to 25 crowns per day, depending upon income.* There are also "leisure centers" for before- and after-school care of older children of working parents, and kindergartens for six-year-olds were introduced in 1975. In 1965, there were places for only 23,000 children in such centers. Thereafter the number expanded rapidly and reached 221,000 in 1977, not including places in kindergartens for six-year-olds. In 1976, there were only 60,000 places in day-care centers for children under six. Plans called for adding 100,000 by 1980.[35] Doubtless the increase in child-care facilities had much to do with the enormous increase between 1965 and 1977 in employment among mothers of preschool children. But in 1977 there were 370,000 mothers of preschool-age children (under seven) in the labor force. Obviously, many of these women had to find other means of child care while they worked. (Sweden is nevertheless far better off in this respect than the U.S. where it is estimated that only 10 to 15 percent of preschool children of working mothers could be accommodated in—mostly private—day-care centers in 1978.[36])

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1 Swedish crown = 24¢ approximately.

In theory, fathers are now encouraged to share childrearing responsibilities. Under a "parenthood insurance scheme" fathers now receive most of the childcare benefits guaranteed to mothers. Most conspicuous is paternity—or maternity—leave: eight months of leave after a child's birth at 90 percent of salary and another month at a minimum of 32 crowns (about $7.70) per day. Three months can be saved and spread out over the child's first eight years in the form of full or partial days off from work. Fathers as well as mothers can also take up to 18 days paid leave a year to stay home with a sick child, and fathers can receive "sickness" benefits to stay home with older children while their wives (or "cohabs") are in the hospital having a baby. Public offices and businesses are also being encouraged to allow both fathers and mothers of young children to shorten their work day or week at little loss in pay.

In practice, however, equally shared childrearing is still far from reality. In 1978, four years after it was introduced, only 10 to 12 percent of new fathers took paternity leave and most stayed home far fewer days than new mothers did. "A father on paternity leave is still considered an oddity," and a member of the parliamentary Committee on Equality of Men and Women has commented: "Changing attitudes is a very slow job."[37] Employers and the men themselves find it hard to juggle office responsibilities to allow for the part-time absence of men taking paternity leave—most of whom have so far been "well educated and well paid—and thus likely to hold responsible positions," according to a 1979 report to the *Wall Street Journal*. Thus the responsibility for home and children still falls largely on women. Most manage by taking only part-time (and lower paid) work. In 1978, 45 percent of Swedish employed women were working part-time, compared to only 6 percent of men in the labor force—and 29 percent of American working women (in 1980).[38] A 1976 Survey of Living Conditions revealed that husbands of full-time working women help with housekeeping chores more than those of women who work part-time, but in all households, women are still far more likely to do more of those chores than their husbands.[39]

Swedish Information Service

Fathers are now encouraged to share in childrearing but, in practice, women still bear the brunt of child and home responsibilities.

Family allowances and housing

Sweden's "cradle-to-grave" social welfare scheme includes several other measures besides paid paternity/maternity leaves aimed at reducing the burdens of childbirth and rearing. Though first introduced during the low birth rate years of the 1930s, these measures are promoted not on demographic but on egalitarian grounds.

All women giving birth receive free medical care before, during, and after delivery. Most infant, preschool, and school child health care is free, and school children receive a free school lunch. A child allowance of 2,260 crowns ($540) per year is paid to parents for each child under 16. And for each child over 16 attending secondary school there is an annual allowance of 1,600 crowns. University students receive a state study grant of 16,500 crowns a year (nearly $4,000)—2,000 crowns as a scholarship and the rest as a loan. Families are eligible for a state housing allowance according to their income, number of children, and housing costs. For example, a family with two children and an annual income of 50,000 crowns which must pay out a quarter of that income for housing would receive an allowance of about 5,400 crowns a year. In 1974, almost half of all families with children and 90 percent of single parents received this allowance.[40]

The housing allowance is probably one of the most important measures for enabling families to afford additional children. Until recently, housing shortcomings could be seen as a major constraint on fertility in Sweden—both in the number of available dwellings and the size of living quarters. But the situation improved even as the birth rate fell.

Housing shortages were still severe in the 1960s, due to migration to towns, the need for reconstruction in older parts of the cities, and high construction costs. Two-thirds of dwelling units in the "densely-settled" areas where 83 percent of Swedes live were located in "multi-family buildings" or apartment houses in 1975. But, thanks to a special effort, by 1974 over half (56 percent) of families with preschool children and two-thirds (67 percent) of those with children aged 7 to 18 were living in single-family dwellings.[41]

Dwelling units have also increased in size. In 1960, there was an average of only 1.5 rooms per household, not including kitchens. By 1975 the average had doubled to 3 rooms.[42] Swedish families are now also far more likely than they once were to have enough bedrooms to ensure that nobody has to sleep in the living-room—a situation which Swedes, like Americans, are anxious to avoid.[43] Using census data on the number of rooms available in households of families with one, two, or three children and assuming that one of these rooms is a living-room and the rest bedrooms, we have calculated that only 40 percent of families had a separate bedroom for the parents and one for each child in 1960. By 1975, however, the figure was up to 67 percent.[44] In short, the housing situation must be much less of a constraint on fertility than it once might have been.

Birth Control

If Swedish couples are currently opting to have only one or two children, certainly efficient contraceptives and very liberal abortion are now available to help them attain this goal. In the past, as we have seen, late marriage and widespread celibacy were major ways of controlling fertility. But there is evidence that fertility was also controlled within marriage as far back as the early 18th century in some parts of Sweden. Withdrawal, abstinence, and (illegal) abortion were probably the main methods used until fairly recent times. To these were added homemade mechanical devices and, in the first decades of the 20th century, condoms and diaphragms.

The low birth rates of the 1930s are evidence that collectively these methods were effective, although probably with some psychic cost and, in the case of abortion, health risks. With today's birth control methods, Swedish couples are undoubtedly far better able to avoid having more children than they want. Indeed, a 1967 survey found that Swedish women actually had fewer children than they desired. The average ideal number then was 2.4: 1 percent wanted no children; 2 percent wanted one child; 56 percent, two children; 33 percent, three children; and 6 percent, four or more.[45]

Contraceptive methods and practice

Pills were introduced in Sweden in 1964 and IUDs were approved in 1966. The pill was popular right away but Swedish women did not adopt the IUD in significant numbers until the copper spiral was introduced in 1972. Until the 1970s, however, the most readily available of reliable contraceptives was the condom which can be obtained from supermarkets, pharmacies, and vending machines. Pills and IUDs required seeing a physician which meant a private visit at $20 to one of the only 450 gynecologists then practicing in the country or a long wait for appointments at understaffed maternity centers or one of the only two centers run by the Swedish Family Planning Association. In a 1967 national probability survey of 1,600 men and women who were married, engaged, or "going steady," 38 percent of respondents reported having used a condom during their most recent intercourse; 17 percent had used withdrawal and only 14 percent the pill and 1 percent an IUD. Some 27 percent used no contraception.[46] By 1976, it was estimated that about 70 percent of women of reproductive age were using contraception. This was about the same percentage as in 1967 but the methods used had changed radically: 30 percent used the pill; 20 percent, the IUD; 12 percent, the condom; and perhaps 10 percent, traditional methods (including withdrawal) or sterilization.[47]

Before 1976, sterilization was forbidden for men (except for medical purposes) and permitted to women only for medical, eugenic, or "socio-medical" reasons. A new Sterilization Act implemented in 1976 now allows sterilization as a form of birth control on request to any person 25 or older (and to those 18-24 years old with special permission). As a result, numbers of sterilizations jumped from the annual pre-1976 level of 1,000-1,900 to 5,200 in 1977 and 5,900 in 1978, when a third of them were obtained by men. Although still modest, these numbers are far from trivial. Sterilization should gain rapidly in the years ahead if its popularity in Sweden measures up to even half that in the U.S. where a national fertility survey revealed that already in 1976 sterilization was nearly up to pill use among all married couples with wives aged 15-44 (19 percent compared to 22 percent) and far more popular than the pill among couples with the wife aged 35-44 (29 percent versus 8 percent).[48]

The Swedish Institute: Photo by Bengt Malmqvist

Abortion

The increased use of effective modern contraceptive methods coincides with the sharp fall in Sweden's fertility since the mid-1960s. But increased abortion has probably also played a role.

Sweden's abortion law dates back to the 13th century. Abortion was regarded as enough of a public problem for severe penalties to be introduced in the 15th century and the death penalty in the 17th century. The death penalty was eliminated in 1864 and other penalties eased in 1890 and 1921. Although the 1921 law still prohibited induced abortion under any circumstances, genuine medical reasons had by then come to be accepted unofficially as sufficient justification.

Growing alarm over increasing illegal abortion led to a major investigation in the 1930s and in 1938 Sweden joined Iceland and Denmark as among the first countries in the world to permit abortion under limited conditions: medical (childbirth threatens the woman's life or health); humanitarian (rape or incest); or eugenic (danger of fetal abnormality). A 1946 amendment added sociomedical conditions (the woman's living situation could be taken into account) and another in 1963 accepted probable fetal injury as a sufficient reason. The next major step was the current law, implemented January 1, 1975. Among the world's most liberal, this law specifically recognizes a woman's right to alone decide on an abortion up to the 18th week of pregnancy.

Despite progressive liberalization, the law was interpreted with caution until the early 1960s. Administrative delays were frequent and the number of abortions consequently low: 6,300 at the peak in 1951 and 2,800 in 1960. Up to 1965, more than 85 percent of legal abortions required authorization by the National Board of Health in Stockholm and the remainder required certificates signed by two physicians. Under growing public pressure, practices were relaxed and by 1970 three out of five abortions were being granted by the less time-consuming two-physician procedure, applications increased, and numbers of abortions climbed steeply. By 1974, the year before restrictions were largely eliminated by law as well as in practice, 30,600 abortions were recorded—nearly ten times the 3,200 performed in 1962 (Table 8).

Table 8. Births and Legal Abortions: Sweden, 1962-1978

Year	Live births	Legal abortions	Abortions per 1,000 live births
1962	107,284	3,205	30
1963	112,791	3,528	31
1964	122,664	4,671	38
1965	122,806	6,209	51
1966	123,354	7,254	59
1967	121,360	9,703	80
1968	113,087	10,940	97
1969	107,622	13,735	128
1970	110,150	16,100	146
1971	114,484	19,250	168
1972	112,273	24,170	215
1973	109,663	25,990	237
1974	109,874	30,636	279
1975	103,632	32,526	314
1976	98,345	32,351	329
1977	96,057	31,462	328
1978	93,248	31,918	342

Sources: 1962-1975: Olav Meirik, Karl-Gösta Nygren, and Björn Smedby, "Birth Rate and Birth Control in Sweden 1962-1976," *Lakartigningen*, Vol. 75, No. 6 (1978) Figure 1, p. 426; 1976-1978 National Central Bureau of Statistics, *Population Changes 1978*, Part 3 (Stockholm: 1980) Tables 3.19 and 3.24.

Some observers feel that legal abortions have merely substituted for what would formerly have been illegal abortions in Sweden and consequently have had little net impact on the birth rate. Potts, Diggory and Peel, for example, point out that in the 1930s, before the first liberalization of the law in 1938, numbers of illegal abortions were estimated at 10,000 to 20,000 annually, or 100 to 200 induced abortions per 1,000 live births.[49] This is in the same range as the legal-abortion-to-live-birth ratios of 1968 to 1972 (see Table 8) when the crude birth rate was about 13-14—also virtually the same as in the 1930s. Several Swedish physicians, however, feel the rise in legal abortions reflects much more than just substitution for illegal abortion and thus must account at least in part for the fall in annual births and fertility rates from the mid-1960s to the mid-1970s, although improved contraception was probably equally important.[50]

In years to come, contraception is likely to displace abortion increasingly as the preferred approach of Swedish women determined not to go beyond their desired number of children, whatever that number may be. Annual numbers of abortions have leveled off since passage of the 1975 law, as also seen in Table 8. This could mean that another major objective of the law has begun to take effect. In addition to providing abortion on demand, the legislation sought to reduce the number of abortions by stressing contraception as the primary means of birth control, with abortion regarded as "an emergency measure." The new sterilization law was seen as part of this larger purpose. Efforts have also been stepped up to expand public contraceptive services by training 600 midwives to do gynecological examinations, insert IUDs, and provide pills, for example. There are now also 20 special family planning centers for young people. Family planning consultations, diaphragms, IUDs, and condoms are free at public health centers and pill costs are subsidized. And by 1977, some 5 million crowns ($1.2 million) had been allocated to increase family planning information, especially among youth and women's organizations.[51]

Mortality Trends

Unlike fertility patterns, recent Swedish trends in mortality have been mostly gradual and consistent and therefore require less attention.

From an average annual rate of 27 per 1,000 population in the second half of the 18th century, the crude death rate declined fairly steadily until it reached a low point of about 9.5 in the mid-1950s. Thereafter, it began to creep up and has been between 10.5 and 11.0 in recent years (Table 1, page 6).

The crude death rate is determined by death rates at each age and the age structure of the population. Age structure influences the crude death rate because death rates are much higher among the elderly than among younger persons. If the elderly portion of the population increases because of declining fertility and hence relatively fewer young people, the crude death rate is likely to rise. This is what has happened recently in Sweden. Until the mid-1950s, the continuing decline in age-specific death rates was great enough to more than offset the inflating effect of the population's aging on the crude death rate. After that, however, the aging of the population accelerated. In 1900, persons 65 and over made up 8.4 percent of Sweden's population. Half a century later in 1950, this portion had increased only 1.8 percentage points to 10.2 percent. But in the next quarter century, the figure grew by 5.3 percentage points to reach 15.5 percent in 1976. This sharp increase was mainly the result of the pronounced decline in the birth rate from the mid-1960s. (See "Changing Age Structure and the Elderly" following.)

The trend in age-specific death rates can be illustrated by life expectancy at birth (the average number of years a newborn could be expected to live if current mortality rates were to continue). This measure is constructed from age-specific death rates of a given year or period and thus conveniently summarizes their level at that time. As age-specific death rates fall, life expectancy rises. Table 9 (next page) indicates that Sweden's age-specific death rates have fallen steadily since the middle of the last century and life expectancy has risen accordingly, although the gain was appreciably slower after the 1950s. By 1978, life expectancy for Swedish women (78.6 years) was exceeded only by Iceland's (79.2 in 1975-76) and that of Swedish men (72.4) trailed only the figures in Iceland and Japan (73.0 and 72.5 respectively).

Interestingly, Swedish women had a 3.9-year edge over men in life expectancy already in the mid-19th century. The gap narrowed thereafter, but after World War II it widened rapidly, as in

Table 9. Swedish Life Expectancy at Birth 1851-1978 and International Comparisons

Year	Life expectancy at birth (years) Male	Life expectancy at birth (years) Female	Sex differential (Female minus male)
Sweden			
1851-60	40.5	44.4	3.9
1901-10	54.5	57.0	2.5
1941-50	68.1	70.7	2.6
1951-60	70.9	74.1	3.2
1961-70	71.7	76.1	4.4
1971-75	72.1	77.7	5.6
1976	72.1	77.9	5.8
1977	72.4	78.5	6.1
1978	72.4	78.6	6.2
International Comparisons			
Iceland 1975-76	73.0	79.2	6.2
Japan 1976	72.5	77.4	4.9
Netherlands 1977	72.0	78.4	6.4
Norway 1976-77	72.1	78.4	6.3
United States 1977	69.3	77.1	7.8

Sources: Sweden: National Central Bureau of Statistics, *Population Changes 1978*, Part 3 (Stockholm: 1980) Table 4.17, p. 120; International: Population Division, United Nations, personal communication, May 1980; United States: National Center for Health Statistics, *Vital Statistics of the United States*, Vol. II, Section 5, *Life Tables* (Hyattsville, Md.: 1980).

most other industrialized countries, and was over six years by 1978. This is further illustrated in Figure 6. Since the late 1940s, the decline in age-specific death rates has been much greater for females than for males, except among infants and children under 15. The figure also reveals that mortality declines in this period, as in the past, have been much greater for infants and children than for older persons. The decline was least among the elderly aged 65 and over.

Much of the steady gain in life expectancy is due to the historical fall in the infant mortality rate (deaths under one year of age per 1,000 live births). Sweden has the world's longest series of infant mortality data, dating back to the early 18th century. At the end of that century, infant deaths stood at about 200 per 1,000 live births. The rate dropped 100 points in the next 100 years and another some 75 points, to 24, by the late 1940s. The pace of the decline slowed slightly after that but in 1966-70, the rate was down to 12. Contrary to expectations, it has continued to fall rapidly. By 1978, Sweden's infant mortality rate was 7.8 (6.7 for girls and 8.9 for boys)—the lowest rate in the world, as it has been for many years. Next lowest in the world in 1978 was Japan at 8.4; the U.S. infant mortality rate in 1978 was 13.6.[52]

Sweden's ability to keep infant—and all—death rates low is not a recent development. With Norway, Sweden had the lowest infant and child death rates in Europe more than a century ago. A U.S. observer notes:

> "Medical care, like education, has been regarded as both a communal responsibility and an individual right in Sweden long before the advent of the modern welfare state. . . . Prenatal care, delivery, and postnatal care

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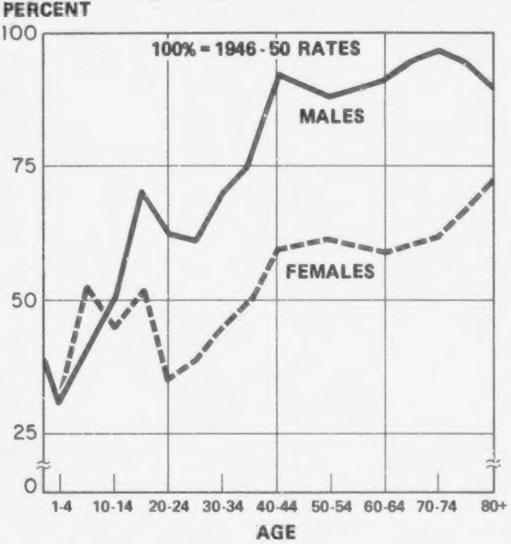
Figure 6. Swedish Age-Specific Death Rates 1972-76 as Percentage of 1946-50 Rates



Source: See Figure 2, Diagram 3.2, p. 21.

have been free and readily available throughout Sweden for many decades. Sustained professional care of pregnant women and later of their babies is universal. Such established and routinized care has not come this far in the U.S., and it is free only for the indigent."[53]

The unexpectedly rapid infant death rate decline of recent years is credited to continued improvements in medical diagnosis and prenatal care. Also important, as noted, is that two-thirds of all births now occur to women in their twenties—ages when the risk of delivery complications are least.

Changing Age Structure and the Elderly

A population's age structure (the relative number of people in different age groups) is shaped by trends in fertility, mortality, and migration. Normally, fertility is the major influence. A sustained high level of fertility produces a youthful population with a large proportion of children and youth. As fertility falls, the population "ages" with a decline in the proportion of young people and a relative increase of persons in the older ages. For Sweden, the series of population pyramids in Figure 7 displays this aging process graphically (next page).

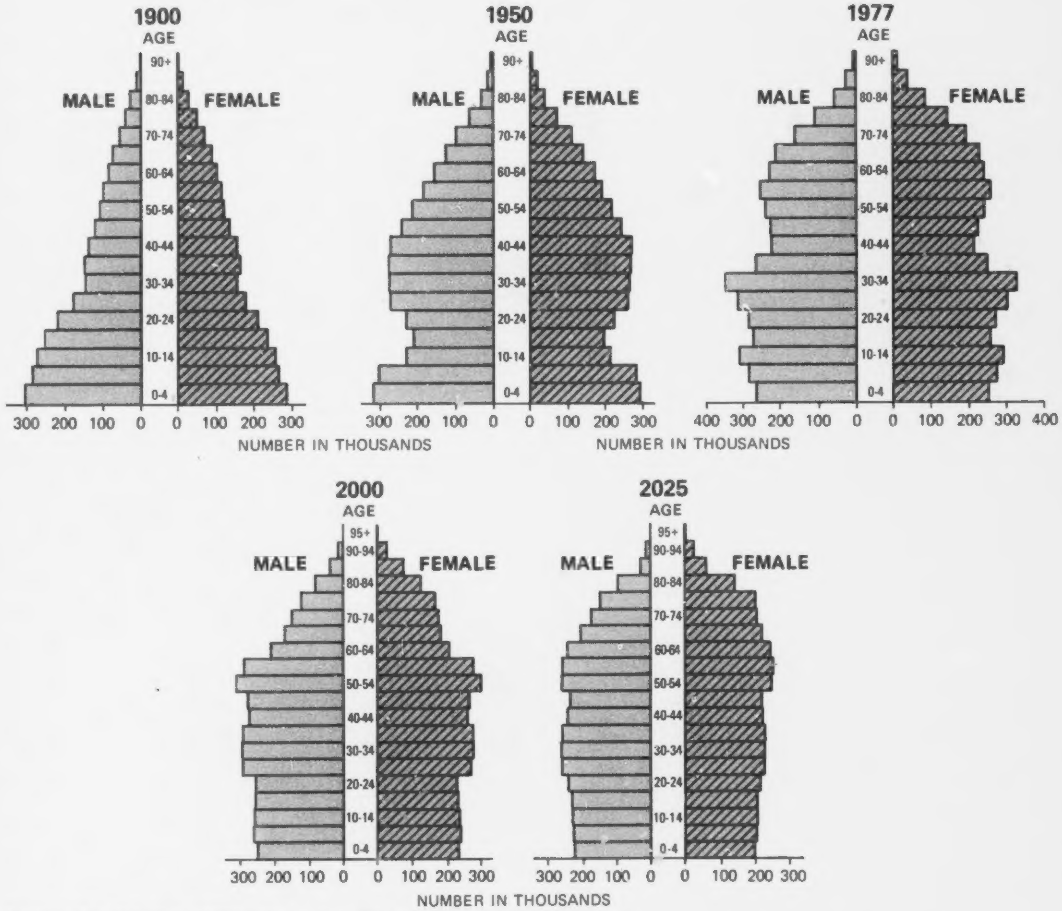
The pyramid for 1900 has the triangular shape characteristic of a youthful population, reflecting the moderately high birth rates (around 30 per 1,000 population) of the second half of the 19th century. The slight break in the pyramid at ages 30-40 is explained by the heavy emigration of young men in particular during the 1880s and 1890s. In the 1950 pyramid, the indentation at ages 10 to 24 reflects the birth rate drop between 1925 and 1940 and the broader base (children under 10) reflects the rising birth rates of the 1940s.

With the lengthening period of low fertility, Sweden's population pyramid was beginning to assume the rectangular shape of a "stationary" population by 1977. The numbers of people in the younger ages were more nearly equal to those in the older age ranges. The pyramids for 2000 and 2025 are based on the main population projection described earlier which assumes a total fertility rate rising to 1.8 in 1985 and constant thereafter and no net immigration after 1985. Sweden's actual population age structure in 2000 and 2025 will probably turn out to be more irregular than depicted here because fertility will undoubtedly not remain unchanged. However, the fluctuations should be more modest than previously and the level of fertility could very well remain low. This would result in a continued equalization of age cohorts and an increased aging of the population.

Average population age and proportion of elderly

In 1900 already, 30 was the average (mean) age for both men and women. By 1950, the average was up to about

Figure 7. Sweden's Population Age Structure 1900, 1950, 1977, and as Projected for 2000 and 2025



Source: See Figure 2, Diagrams 1.1, p. 8, and 5.3, p. 35.

35 years. In 1977, it stood at 37.0 for men and 39.2 for women. (The *median* age of Swedish men and women in 1977 was about 35, compared to a median of 29.4 years for the U.S. population in 1977.) If the current medium population projection holds (a constant TFR of 1.8 and no net immigration after 1985), the figures for 2025 will be 40.4 for men and 43.4 for women.[54] The higher population projection, which assumes a constant TFR of 2.1 after 1985, would reduce the 2025 figures by about three years and the lower projection of a constant TFR of 1.5 would add about three years. The population's average age would also be lower in 2025 if Sweden continues to have some net immigration. Net immigration has a significant rejuvenating effect on a population because immigrants tend to be mostly young adults and children. Also the fertility of recent immigrants to Sweden has been higher than that of native Swedes, as noted in the next section.

Sweden's rising average population age of course reflects increasing proportions of the elderly. As noted, the proportion of persons of retirement age, 65 and over, nearly doubled from 8.4 percent to 15.7 percent between 1900 and 1977. (In the U.S., the proportion of the population in this age range is currently about 11 percent.) At the same time, however, the proportion of youngsters under age 15 declined by a greater amount—from 32.4 percent to 20.4 percent, or 12 percentage points. As a result, the ratio of people in the "economically productive" ages (15-64) to those in the "dependent" ages (under 15 and over 64) became increasingly favorable during the first three-quarters of this century. However, the easing of the dependency load that might have resulted from these shifts in age structure was offset by the extension of education—especially higher education—and the development of a national pension system. Young people began to stay in school longer and older people retired earlier.

If the main population projections materialize, the proportion of persons aged 65 and older will rise slightly to 16.4 percent in 2000 and then jump to 20.0 percent in 2025. The proportion of children under age 15 will decline continuously while the percentage of working-age adults would first rise a bit and then decline.

Within the working-age proportion of the population and among the elderly group there have been and are projected to be important variations. The working-age population itself has aged and will continue to do so over the 1977-2025 period, with a decline in the proportion aged 15 to 39 and increases in the relative numbers of people 40-64 years old. Similarly, the group of 65-and-overs will grow older. The total number of persons in the retirement ages, 65 and over, will increase by 260,000 from 1.30 million to 1.56 million between 1977 and 2025. But some 235,000 of that increase will come among the elderly who require the most costly services, those aged 75 and over. Further, most of this increase will occur during the decade before 1990. More troublesome still is the foreseeable increase of the very old, aged 85 and over, from 90,000 in 1977 to 160,000 in 2000, a growth of almost 80 percent.[55]

Cost of elderly support

Regarding his country's demographic outlook, Swedish demographer Ingvar Holmberg comments:

> "Despite the somewhat gloomy picture sometimes painted, there is probably no one who really believes in a picture of Sweden as a country with an increasingly declining population, populated mainly by old people and only a small number of children: a country where the former day nurseries are used as pensioners' dwellings and where industry is kept going by an increasingly aging workforce."[56]

The figures on the elderly cited above, however, are numbers, not percentages. Thus even in the unlikely event of a sudden rise in the birth rate, there is no escaping the added burdens of care and cost that will come with the rapid increase in absolute numbers of the aged whatever may happen to their *relative* numbers. That the increases will be particularly rapid during the 1980s is unfortunate, given the difficulty Sweden, along with the other Scandinavian welfare states, is currently experiencing in meeting the mounting costs of inflation-bloated social benefits. From this perspective, Sweden would be better off with no immediate reversal in its declining birth rate for that would increase the absolute and relative number of youthful dependents without diminishing the absolute number of aged dependents. Between 1990 and 2005, the number of elderly will decline somewhat with the entry into retirement age of the smaller birth cohorts of the 1930s. At that time, other things being equal, an increase in the birth rate would be more affordable.

Sweden is already experiencing what Holmberg terms a "crisis" in finding

The cost of supporting the elderly is escalating in Sweden and is destined to rise still higher with the projected increase in the number and proportion of elderly persons.

enough staff to provide the medical and long-term care needed by the very old. But overwhelming this is the escalating financial cost of supporting retired persons. The official age for retirement was lowered to 65 in 1976, confirming what had actually been long-standing practice for most workers. All retired persons 65 and over receive a basic pension and, if they have worked, a supplementary pension. The two pensions together add up to two-thirds of the average income received during a person's 15 best-paid working years. Since 1976, employed persons aged 60-65 have also been permitted to cut down on working hours, receiving a partial pension in return. In early 1978, there were about 1.6 million full or partial pensioners compared to just over 4 million employed persons. All three pensions are adjusted upward monthly to keep up with inflation.

Sweden's bill for all social welfare costs in 1975 totaled 71.2 billion crowns ($17.1 billion at the current exchange rate of 24¢ per crown), representing an outlay of 8,680 crowns or $2,080 per capita and one-fourth of the country's gross domestic product. Of this, some 21 billion crowns went for pensions. Another 3 billion was spent for homes and other special assistance for the aged, and "sickness" benefits for persons 65 and older are estimated at an additional 10 billion crowns. Thus, some 48 percent of Sweden's total social welfare budget of 71 billion crowns in 1975 went for support of the elderly.[57]

Both the share of the budget and amounts spent on the elderly have escalated since then. In just the three years between 1975 and 1978, total social welfare expenditures increased by a fifth (71.2 to 87.0 billion crowns) but the cost of basic pensions climbed by half (15.8 to 23.5 billion) and the outlay for supplementary pensions went up nearly 150 percent (5.0 to 12.3 billion crowns).[58] Obviously the needs of its growing elderly population have much to do with Sweden's budget deficit which in 1980 amounts to 10 percent of the country's gross national product (compared to a budget deficit of less than 2 percent of GNP in the U.S.).[59] And that elderly population is destined to grow relentlessly over the coming decade.

International Migration

As we have seen, immigration and emigration have played important roles in Sweden's population growth. Emigration predominated until 1930, helping to relieve the pressure of the growing population on the meager resources of the poor agrarian society of the 19th and early 20th centuries. But in the past 50 years, mainly because of the rise in levels of living that accompanied social and economic development, Sweden has become an immigrant rather than an emigrant society. Coming at a time when its natural increase has reached low levels, net immigration has thus been increasingly responsible for continued Swedish population growth. It has also begun to reduce the high degree of ethnic, linguistic and cultural homogeneity that has prevailed for centuries in Sweden, prompting a growing concern about the future character of the society.

In the poor agrarian society of the mid-19th century, there were many who were attracted to the opportunity to better themselves in the U.S. The trickle overseas began in the 1840s and grew modestly until a famine in Sweden caused an explosion of emigration in the late 1860s. After a brief slowdown, "America fever" reached its heights for about 15 years, beginning in the late 1870s. The volume of emigration was much lower thereafter, except during the first decade of the 20th century and briefly in the early 1920s following World War I.

All told, from 1865 to 1930, nearly 1.4 million Swedes left their country. Close to 400,000 later returned. Since Sweden's population averaged about five million during this period, the one million net emigrants were obviously a considerable loss, particularly since most were young adults. There was not only the direct loss of the emigrants themselves but also the indirect loss of their descendants. It has been estimated that:

> "If an attempt had been made in 1850 to make a projection of the trend of population in Sweden up to the beginning of the 20th century, the following figures would have been produced:
>
> 1900 6.5 million
> 1910 7.4 million.
>
> In these years, the actual population counts were:
>
> 1900 5.1 million
> 1910 5.5 million.
>
> . . . The 'loss' of nearly two million [as of 1910] was attributable to rather more than a million emigrants and their decendants."[60]

From emigration to immigration

Emigration slowed in the late 1920s after passage of restrictive immigration legislation in the U.S. in 1923 which reduced the oppo[illegible] for Swedes to leave for what h[illegible]g b[illegible] their favorite destination. [illegible]viously over 80 percent of [illegible] emigrants had gone to the U.S.) High unemployment in the U.S. during the Depression of the 1930s further reduced that country's attraction for Swedish emigrants. (Indeed, many Swedes left the U.S. for Sweden during this time.) Nor were other countries attractive sites for relocation during the 1930s. Finally, emigration was virtually extinguished during the World War II years of 1939 to 1945. (However, many refugees came to Sweden during those years.) After the war, the Swedish economy expanded rapidly, and the demand for labor outstripped the supply. There were jobs for everyone—indeed, a substantial need for foreign labor—at increasing levels of pay. Sweden became a country to go to, not one to leave.

Refugees were the main type of immigrants in the 1940s, but foreign workers predominated during the next two decades. Total net immigration for these decades was:

1940s	134,000
1950s	106,000
1960s	235,000

During the 1950s, the foreign workers came primarily from West Germany and the other Nordic countries (Finland, Norway, Denmark, and Iceland), especially after 1954 when an inter-Nordic free labor market was established.

Two major waves of immigration highlighted the 1960s. The middle of the decade saw a sharp influx of workers from Southern Europe, especially Yugoslavia, Greece, Italy, and Turkey. Immigrants from these four countries went from less than 3,500 in 1964 to 9,000 in 1965 and over 12,000 in 1966. An economic boom in the late 1960s attracted a second, considerably larger wave. For 1968-1970, the annual average totaled close to 70,000, up from some 42,000 during the preceding three years. Finns, who had been the largest group of immigrants for some time, comprised over half the total in this wave.

With the fading of the boom, immigration subsided to nearly 30,000 in 1972 and 1973. Although it went up again to about 45,000 per year in 1975-77, the peak was substantially less than that of the late 1960s. This reflected stricter application of restrictive regulations adopted in 1967 as the business cycle headed down again during the early 1970s. Prompted by concern over the impact of growing immigration on social welfare, housing, and employment opportunities for "marginal" Swedish workers, i.e., women, the elderly, and the handicapped, these regulations required non-Nordic citizens to have jobs, labor permits, and housing all arranged before entering Sweden.

These became increasingly difficult to get during the 1970s. As a result, the number of immigrant workers entering Sweden from non-Nordic countries dwindled to almost nothing. However, there was a considerable increase in refugees. Between 1974 and 1978, Sweden took in almost 12,500 Latin Americans, for example, most of them refugees fleeing government upheavals, particularly the ousting of Chile's President Allende in 1973.[61] Relatives of immigrants already in the country have comprised another substantial category of recent immigrants. With these two categories now making up larger fractions of total immigrants, the relationship between the business cycle and immigration has weakened. Finns remain the largest single national group of immigrants, comprising at least a quarter of the total each year. Citizens of other Nordic countries, while also continuing to enjoy the freedom of movement of the Nordic common labor market agreement, have come in more modest numbers (except for the 17,000 Danes who found economic conditions at home too depressing in 1974 and 1975).

Emigration has generally amounted to less than half the volume of immigration in the post-World War II period except for 1971 when immigration exceeded emigration by only a few thousand, and in 1972 and 1973 when the outflow exceeded the inflow by about 11,000 each year, the only two years of migration loss since 1929.

The figures on emigration largely reflect return migration. Almost half of postwar immigrants have emigrated after a short time in Sweden, most often in the year following the one in which they came. Immigrants from Northern Europe have been much more likely than those from Southern Europe to return home. With return migration accounting for so much of emigration, the size of each year's outflow has been closely related to the size of the inflow in the immediately preceding years. Thus the large increase in emigration in 1971-73 is partly explained by the large increase in immigration in 1968-1970. And as immigration fell subsequently, so did emigration.

Demographic impact of immigration

Table 10 lists the numbers of foreigners in Sweden at the end of 1977 by country of origin. As might be expected, Finns comprised by far the largest proportion: 45 percent of the total of 424,400. Yugoslavians, the next largest group, made up just under 10 percent. In 1977 there were also an additional 300,000 immigrants who had become naturalized Swedish citizens and another some 300,000 persons who were born as Swedish citizens but who had a mother or father who was not a citizen. Currently, it is estimated that over a million of the 8.3 million people in Sweden—or as many as one in every eight persons—are either immigrants themselves or children of postwar immigrants.[62] Al-

Table 10. Foreign Citizens in Sweden by Country of Origin: December 31, 1977

Country of origin	Number	Percent
Finland	188,972	44.5
Yugloslavia	40,796	9.6
Denmark	34,268	8.1
Norway	27,356	6.4
Greece	18,361	4.3
West Germany	16,147	3.8
Turkey	13,372	3.2
Poland	8,609	2.0
Great Britain	8,347	2.0
United States	6,102	1.4
Italy	5,749	1.4
Austria	3,790	0.9
Hungary	3,102	0.7
Other	49,989	11.7
Total	424,445	100.0

Source: National Central Bureau of Statistics, *Population Projection for Sweden 1978-2025 (Information i prognosfrågor* 1978:5) (Stockholm: 1978) Table 4.2, p. 29.

though the population is still highly homogeneous, this is a big change from the 1930s when the shift from emigration to immigration began. At that time, less than 0.3 percent of the population held foreign citizenship (compared to 5.1 percent in 1977) and the numbers of naturalized citizens and immigrant children were probably equally negligible.[63]

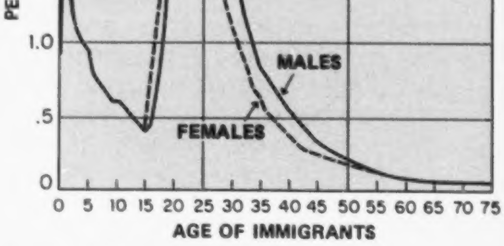
The demographic impact of the large postwar immigration has obviously been substantial, via natural increase as well as the direct gain from the excess of immigrants over emigrants. From the beginning of 1944 to the end of 1977, the excess of immigrants over emigrants amounted to half a million (the difference between some 1.1 million in and 0.6 million out) or about 29 percent of the 1.74 million added to the Swedish population in those 34 years. If one also takes into account the natural increase (excess of births over deaths) of immigrants, the contribution of immigration to the growth of 1.74 million in this period was fully 800,000, or almost 46 percent, with natural increase making up about 17 percent of the gain.

As is often the case, a large proportion of the migrants have been young adults (Figure 8). This younger average age of the aliens means that their crude death rate is considerably lower than the rest of the Swedish population (even though their age-specific death rates are a little higher than those of Swedish citizens). At the same time, the fertility of foreign women in Sweden is greater than that of Swedish women. In 1978, for example, total fertility rates per woman by country of citizenship were:[64]

Sweden	1.56
All other	2.12
including:	
Denmark	2.00
Finland	1.79
Norway	1.87
West Germany	1.93
Greece	2.72
Yugoslavia	2.10
Turkey	5.23

It follows that the rate of natural increase is much lower for Swedish citizens than for aliens residing in Sweden.

Figure 8. Age Distribution of Immigrants to Sweden: 1973-1977



Source: See Figure 2, Diagram 4.3, p. 29.

Table 11. Natural Increase Among Swedish Citizens and Aliens in Sweden: 1971-1978

	Excess of births[a] over deaths		
Year	Swedish citizens	Aliens	Total
1971	22,116	9,651	31,767
1972	19,194	9,023	28,217
1973	15,779	8,244	24,023
1974	15,365	8,193	23,558
1975	7,266	8,158	15,424
1976	- 600	8,268	7,668
1977	- 232	8,087	7,855
1978	- 4,602	8,169	3,567

Sources: National Bureau of Statistics, *Population Changes*, Part 3, for each of the years listed above.

[a] Births according to citizenship of the mother.

In 1972, natural increase was 3.1 per 1,000 for Swedish citizens and 23.3 per 1,000 for aliens.[65] As we have seen, Sweden's total rate of natural increase declined steadily throughout the 1970s and has been below one per 1,000 population since 1976 (see Table 1, page 6). The more detailed data shown in Table 11 reveal that the decline was caused by a steady fall in the natural increase only of Swedish citizens. Every year from 1976 to 1978, at least, there were fewer births than deaths among the Swedish majority of the country's population, especially in 1978. The fact that overall natural increase has not yet turned negative is thus entirely due to continued natural increase among the small alien minority.

Currently, then, all of Sweden's low population growth is dependent on immigration. Of the 2.29 per 1,000 total population gain in 1979, a quarter (0.59 per 1,000) was due to natural increase (among aliens only) and the other three-quarters (1.69 per 1,000) was due to net immigration (Table 1). Consequently, unless the fertility of Swedish citizens increases considerably, Sweden is faced with a dilemma. On the one hand, if it substantially reduces the volume of net immigration, its population may well decline. On the other hand, if it continues to accept the volume of net immigration that has prevailed during the 1970s, let alone during the whole postwar period, and if current trends in natural increase persist, it is faced with a challenge for which its history has not prepared it: how to go about incorporating foreigners into Swedish society. Indeed, even if there were no net immigration, the Swedish population would continue to become more heterogeneous if natural increase continues to be negative for Swedish citizens, the vast majority of whom have been born in Sweden to Swedish parents.

Immigration Policy

Sweden's shift from an emigration to an immigration country was not the result of conscious policy. Rather, an immigration policy has evolved after the event and can be traced through three periods: 1944 to 1963, 1964 to 1973, and 1974 to the present.

Immigration during the first 20 years was largely in response to Sweden's feeling of a moral obligation, as a neutral nation spared the ravages of World War

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II, to accept displaced persons and refugees and its great postwar need for labor to maintain the rapid pace of economic expansion. No one at the time recognized what is now seen as the beginning of a persistent process with profound implications for Swedish society. International migration was not even taken into account in population projections until the 1960s.

The unexpected sharp increase in net immigration from 106,000 in the 1950s to 235,000 in the 1960s led to the concern over the threat which immigration posed for Sweden's well-established welfare state that characterized the second period (1964-73). Efforts were begun to provide foreigners with the same benefits and protections enjoyed by Swedish citizens lest they become an exploited, problem-ridden underclass. In the late 1960s, however, the main preoccupation was how to facilitate immigrants' "social" adjustment. Should they be "assimilated" (i.e., become Swedish in every respect, giving up the language and culture of their home countries) or "integrated" (allowed to maintain their distinctive group ethnic identities)? As a result of this "melting-pot" debate, a Commission on Immigration was established in 1968 to investigate what public measures should be taken on behalf of immigrants and ethnic minorities.

The commission's final report, issued in 1974, gave the preference to integration. Widely accepted by the public and government, this led to passage in 1975 of a bill which defined Swedish immigration and minority policy for the first time: *equality* between immigrants and Swedes, cultural *freedom of choice* for immigrants, and *cooperation and solidarity* between the native Swedish majority and various ethnic minorities. Thus "it was finally officially stated that immigration was beneficial to Sweden" for its cultural as well as economic contribution.

To implement this policy emphasis on ethnicity and pluralism, all Swedish municipalities have been required since 1977 to provide immigrant schoolchildren with several hours per week of instruction in their native languages.[66] In 1977, 30,000 students received instruction in over 50 languages. On the other hand, programs have been established to help immigrant adults learn Swedish and a 1973 law requires employers to give immigrant employees 240 hours paid leave of absence to attend free lessons in basic Swedish.

State grants are also provided to immigrant and ethnic minority organizations, which have a combined membership of 80,000. State support also goes to the ethnic press and theatrical activities, publication of literature in minority languages, and to public libraries to buy foreign literature.

An important goal of the 1975 policy was to increase immigrants' opportunities to participate in political decision-making. The right to vote and run for local or regional office was granted to all aliens who have lived in the country for at least three years, a step which the Swedes claim to be the first to have taken. In the 1976 election when the law went into effect, 60 percent of 220,000 eligible aliens voted and some 400 immigrants were elected to public office.

Although it is too soon to make a final judgement, there are indications that a substantial gap still exists between the policy goal of integration with equality, cooperation, and immigrant freedom of choice and its realization. A Swedish reporter observes, for example, that the law entitling foreign workers to 240 hours of Swedish language instruction during paid working hours has "turned into a fiasco" because "companies try to get round the law . . . by not hiring people who have not already received this instruction."[67] David Schwarz, publisher of the *Scandinavian Migration and Ethnic Minority Review* [Invandrare och minoriteter] and himself an immigrant, went much further in 1979, claiming that:

> "Now, three years after the formulation of the lofty goals for immigration . . . everything has continued more or less as it was before. In practice, the school still works towards making immigrant children Swedish and the authorities still continue with their old policy of trying to 'solve' the problems of the immigrants without inviting the participation of the immigrants themselves."

Of the one billion crowns per year currently spent on measures relating to immigration, he asserted:

> "Most goes . . . to solving the immediate problems that arise in connection with the move to a new country (instruction in Swedish, information about Swedish society, work, housing, etc.) at the expense of the long-term aspects of the situation such as cultural and educational problems, equality, and relations with the majority of the population. As a result, the feeling of 'foreignness' is central to the way immigrants perceive themselves as well as to how they are regarded by Swedes."

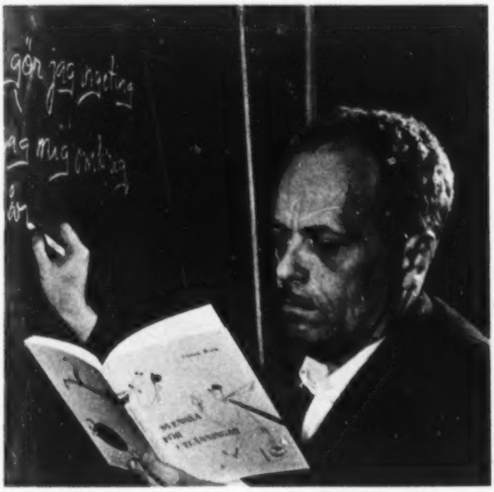
He continued:

> "The situation has already gone so far that there is a great risk of its developing into a very explosive and intractable social problem. From there, it is not such a long step to the policy of throwing out immigrants when they are no longer needed in Sweden, as is done in many other countries."

The de facto practice of assimilation "must be abandoned," he asserted:

> "and immigrants must be allowed to become an integrated part of Swedish society on the same conditions as the Swedes themselves. Unfortunately both the political will and the public support for pursuing such a course are still lacking."[68]

Five Members of Parliament interviewed during the campaign preceding the September 1979 parliamentary elections confirmed the lack of political, if not public, concern for the "unsatisfactory lives and circumstances of immigrants."[69] Former Social Democratic Deputy Minister of Immigrant Affairs Anna-Greta Leijon noted: "As a politician you don't become popular on immigrant issues . . . But a lot of people admit that they're important, and there's a lot of discussion about them." Another MP observed that immigrants "aren't exactly vote-catching" perhaps in part because 400,000 of the then 700,000 adult immigrants still had no right to vote in parliamentary (i.e., national) elections. (In 1979, only the Communist Party favored granting such a right.) The then Deputy Minister of Immigrant Affairs, Eva Winther, felt that political disinterest in immigrant matters merely reflected "the distance that exists between Swedes and immigrants." All five MPs agreed that relations between Swedes and immigrants needed to be improved, that immigrant issues were important despite their lack of political salience, and that the consequences of not solving them would be serious.



Swedish Information Service

Integrating immigrants into Swedish society has caused problems, despite conscientious policy efforts. But without immigration Sweden's population could decline sooner and faster than projected.

Although immigration issues are not yet as political in Sweden as in the U.S., they are equally vexing and visible. In both countries, they have profound and pervasive implications for the nation, provinces (states in the U.S.), and the local community and require a coordinated strategy between the three levels of political action to tackle successfully. Immigration concerns also influence and are affected by important international relations, a fact which constrains what unilateral action these two "receiving" nations might take. In sum, immigration problems in both countries are likely to get worse before they get better. And it probably will require major changes in the perception and evaluation of immigrants, much hard work, and the expenditure of a lot of money before the situation improves.

Recent Population Debate

Immigration issues

As the preceding section suggests, much of recent public discussion of population issues in Sweden has focused on immigration. With the labor needs of the 1950s and 1960s replaced by the growing economic difficulties of the 1970s, free labor immigration from non-Nordic countries has been eliminated. However, the humanitarian willingness of Swedes to accept refugees has compensated considerably for the decline in non-Nordic immigrant workers as has their willingness to admit relatives of immigrants. (An "educated guess" puts the proportion accounted for by these two categories at almost 60 percent of the 39,000 immigrants in 1977.[70])

Although legislation has been enacted to cope with the threat to Sweden's social welfare standards which would be posed by large-scale immigration if immigrants were exploited and to enunciate and implement a policy of integration stressing ethnicity and pluralism, a "lively debate . . . on the lives and circumstances of immigrants" is still being conducted.

> "Swedish newspapers often write about individual deportation cases and occasionally about the lives and circumstances of immigrants generally. Among ordinary people and among politicians, immigrants are a topic of heated, passionate and frequent discussion.
>
> What do people discuss? The native languages of immigrants. How far should we pursue the demand that immigrant children be entitled to learn their home language? Should they attend their own day-care center groups and school classes, where their home language is spoken?
>
> Why do immigrants have such a hard time with the Swedish language, and why has the law entitling them to 240 hours of Swedish language instruction during paid working hours turned into a fiasco?
>
> Should immigrants have the right to vote in Parliamentary elections?
>
> Is there widespread racism in Sweden? If so, why, and what can be done to end it?"[71]

Facing zero population growth

Although the heavy net immigration of the 1960s had a considerable impact on population growth, immigration issues were not then discussed in relation to population growth. Population growth became an issue only in the mid-1970s, stimulated by publicity surrounding the World Population Year and the United Nations World Population Conference of 1974 and the steady decline in the birth rate from 1971 on.

Two main lines of argument have characterized the ensuing discussion. One contends that measures are needed to prevent population decline because the decline itself and associated aging of the population would lead to economic stagnation and increasing inequities in income distribution. The other line sees fertility decline as an indication of a social problem which could be solved by improving the social and economic situation of families with children and by making society a friendlier place for children. (Sweden has now gone much further than most nations in making society at least less inimical to children. Since 1973 there has been an "ombudsman" for children, and a governmental Commission on Children's Rights pushed through a "no-spanking law" in

1979 and currently proposes legislation to permit children to divorce their parents.)

Much of the lively debate has been carried on in the press, with particular attention focused on possible reasons for the fall in fertility. A major reason given is the economic disadvantages of having children under existing conditions, even with generous child-related government support. Maintaining Sweden's welfare state costs workers over half their total earnings in national and local taxes, with many above-average wage earners paying much more than that. And with inflation and a standard sales tax of 20 percent, prices are high for many staples: new automobiles, for instance, cost from $10,000 to two or three times that much, gasoline has been at least $2 a gallon for many years, and steak costs about $8 a pound. Other reasons conjectured for falling fertility include the problems of juggling home duties with a job for the rapidly increasing proportion of Swedish women entering the labor force, the much greater availability since the 1960s of effective contraception and legal abortion (facilitating the achievement of desired family size), the shift in the source of care and support of the elderly from one's children to society, and even a possible women's protest against a male-dominated society. On the last point, a woman's journal editor argues:

> "Women are tired of bringing children into a society where they are not welcome. They want to give their children a complete life. If they cannot get men to share the housework and child care, if there are insufficient good day nurseries, if both parents are not given time to be with their children (because they both have to work), then women will refrain from having children, however much they want them."[72]

Regarding the consequences of the decline in the birth rate, Ingvar Holmberg sees "two almost diametrically opposite views," one held by the older generation and the other by younger adults.[73] The former foresee long-run difficulties because of the adverse effects of age structure changes on the supply of labor and society's ability to care for the sick, the elderly, and children. The latter counter that Sweden already has major shortcomings in the care sector which have nothing to do with fertility decline. The chronic shortage of staff must be solved by organizational changes, they say. As for labor supply, these younger adults contend that a proposed shortening of the work week to 30 hours would affect the volume of available labor much more than a continued fall in fertility. On the other hand, "a sharp increase in the birth rate would lead to difficulties for the educational system and for new entries to the labor market when the large number of children born grow up."[74]

Not surprisingly, defenders of these two positions also disagree on the desirability and feasibility of influencing the current population trend. Those concerned about declining fertility favor measures to improve the economic situation of families with children by granting parents extra credit toward the national supplementary pension and providing them with more favorable tax regulations and larger child subsidies. It has also been suggested that child-bearing and rearing should be made more compatible with parents' labor force participation by shortening the work day, providing sufficient day-care service, and making it easier to get help or time off when children are sick. On the other hand, those who do not believe the birth rate decline is having or will have seriously adverse consequences see no good reason to try to reverse the trend. The adverse effects of low fertility, in their view, can be handled by planning. And it is easier to do this than to cope with the consequences of fertility fluctuations.

Finally, there has been disagreement as to the desirability and feasibility of relying on immigration to solve the problems of population decline and labor supply. Those who favor this solution note the economic advantage to Sweden of gaining adult workers for whom the childrearing and education costs have been borne by other countries. This view is countered by the observation that the sending countries are becoming increasingly aware of the loss which they suffer because they bear such costs and because their emigrants are often skilled workers whom they need. In addition to the growing demand for compensation from sending countries, there is the danger of becoming too dependent on the labor of foreign citizens whose continued services cannot be assured. And there is concern about the impact of increasing heterogeneity resulting from continued immigration, in particular the difficulties of learning to accept and live with people whose physical appearance, language, and culture are different.

Conclusion

Historically low fertility and unprecedentedly high net immigration have clearly posed serious problems for Sweden in recent years. Swedes may disagree on the nature of the problems, how serious they are, and what action should be taken. Still, they have recognized the importance of the issues and have taken action on immigrant problems, admitting the probable need for more action there. Nothing has yet been done about fertility, but Parliament and the public have been paying increasing attention to the birth rate decline and its implications. Several bills concerning fertility have been introduced in Parliament and, if natural increase turns negative, new legislation seems likely.

One reason for their difficulties in deciding what to do about fertility is that Swedes know little about it because they have neglected to study it. (Indeed, with some notable exceptions such as the historians of Uppsala University who have been studying emigration to the Americas for many years, demography has been neglected generally. This is surprising in view of Sweden's long record of reliable demographic data and outstanding analysis of them done in the past.) The oversight has now been recognized by Parliament and the government, however, and efforts begun to rectify it. Under way is a National Central Bureau of Statistics study of the causes of fertility decline. This has three stages. Already completed and reported is the first stage which called for a review of Swedish and international trends in fertility and of the literature on the dynamics of fertility in order to construct a theoretical framework and hypotheses for further research and testing on the determinants of fertility decline. The second and third stages comprise an analysis of the demographic and socioeconomic aspects of fertility changes based on existing data from recent censuses, which Sweden now conducts every five years, and other files, and a survey to gather data directly from individuals and households.

With immigration, in contrast to fertility, the central problem is not theoretical understanding of its causes but rather how to deal with the practical consequences. It took two decades for Swedes to recognize the pervasive and enduring implications of their fundamental shift from an emigrant to an immigrant society. Was this also due to the neglect of demography? Or does it reflect social scientific neglect of ethnic differentiation, which would not be surprising in an extremely homogeneous society? In any case, Sweden has now begun to make up for lost time in the realm of immigration with the development of a systematic policy and programs to implement it.

The legislated objectives—equality, freedom of choice, and cooperation—are admirable. So far these appear to be more promise than fulfillment, but more than a good beginning might hardly be expected in such a historically short time as 15 years. For a citizen of the United States there is much to admire in the Swedish record. Despite a far longer history of immigration and heterogeneity, this country has made much slower progress toward a set of policies designed to ease immigrants' social adjustment, let alone one so attractive as Sweden's.

Another lesson that might be drawn from the Swedish record is the part international immigration could play in staving off actual zero population growth in countries now experiencing very low fertility and the profound effect immigrants might have on the nature of a ZPG society once reached. The subject tends to be neglected in the literature on the ZPG society, at least by demographers who either omit international migration altogether in their theoretical models or make conveniently simplified assumptions about it.

Another implication of the Swedish case for characterizations of the ZPG society is that the aging of the population will be greater than has been contended, at least by Lincoln Day in his 1978 *Population Bulletin,* "What Will a ZPG Society Be Like?" In his "hypothetical stationary population," Day calculated the proportion of the population aged 65 and over as 15.2 percent, pointing out that this was little more than the 14.8 percent of the population in this age range in Sweden in 1974. Only three years later, in 1977, this percentage was already up to 15.7 percent in Sweden and although it is expected to rise to only a little over 16 percent by 2000, the projection for 2025 is 20 percent.

For whatever reasons, this is much larger than the 15.2 percent of elderly persons in Day's hypothetical ZPG population. If the age structures of ZPG populations turn out to be more like that projected for Sweden in 2025 than that of Day's model, the impact of an aging population is likely to be much more pronounced than Day has conjectured. As a test case, Sweden bears watching. □

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